

MAINE STATE LEGISLATURE

The following document is provided by the
LAW AND LEGISLATIVE DIGITAL LIBRARY
at the Maine State Law and Legislative Reference Library
<http://legislature.maine.gov/lawlib>



Reproduced from electronic originals
(may include minor formatting differences from printed original)



Report of the Mold in Maine Buildings Task Force

**Including Recommendations Regarding
Mold and Moisture in Maine Buildings**

Maine Department of Health & Human Services

11 State House Station
Augusta, Maine 04333-0011
Contact: Clough Toppan, 207-287-5686

Maine Department of Environmental Protection

17 State House Station
Augusta, Maine 04333-0017
Contact: Mark Hyland, 207-287-7190

January 2007

Table of Contents

Executive Summary.....	1
I. Introduction	4
II. Background on Consideration of Mold as a Public Policy Issue	5
III. Consideration of Developing Clean Up Standards for Mold.....	7
IV. Consideration of developing building standards to minimize the risk of moisture problems in newly constructed buildings.	8
V. The Current Science of Mold and Health.....	10
VI. Recommendations	11
Appendices	15
Appendix A: Resolve, Directing a Review of Clean-up and Minimization Standards for Mold	16
Appendix B: List of Task Force Participants	17
Appendix C: 2006 Maine Mold Task Force Meeting Notes	18
Appendix C-1: October 30, 2006 Meeting Minutes	19
Appendix C-2: November 14, 2006 Meeting Minutes.....	27
Appendix C-3: December 19, 2006 Meeting Minutes.....	34
Appendix D: Table of Existing Standards	41
Appendix E: MIAQC Policy Statement on Mold Exposure	44
Appendix F: Subgroup Reports.....	46
Appendix F-1 - Summary of Literature on Science of Mold and Health.....	47
Appendix F-2: Building Codes	53
Appendix F-3: Occupational Health Standards for Mold	60
Appendix F-4: Maine Insurance Mold Facts.....	61
Appendix F-5: Real Property Considerations	64
Appendix G: Excerpts from Connecticut Law passed June 7, 2006, and subsequent content of Connecticut Mold Web Page.....	67

Executive Summary

During its second regular session, the 122nd Legislature passed a resolve, L.D. 1971 (Appendix A), which was codified as Resolves 2006 Chapter 174. This Resolve directed the Maine Department of Health and Human Services (DHHS) and the Maine Department of Environmental Protection (DEP) to convene a task force to review issues regarding mold in buildings in Maine.

The resolution identified three specific issues for the task force to review:

- 1) The current science of mold testing and removal;
- 2) Consideration of developing clean-up standards for mold; and
- 3) Consideration of developing building standards to minimize the risk of moisture problems in newly constructed buildings.

DHHS and DEP contracted with the Maine Indoor Air Quality Council (MIAQC), a private nonprofit Maine organization dedicated to the improvement of indoor environments in Maine, to facilitate the work of the task force, provide relevant information, document the work of the group, and prepare this final report.

The task force undertook a lengthy review of each of the three directives, and drew conclusions based on committee discussions.

Conclusions on the current science of mold testing and removal include:

- For the majority of persons, undisturbed mold is not a substantial health hazard.
- Mold is a greater hazard for persons with underlying conditions: mold allergies, asthma, and immuno-suppressed conditions.
- Prolonged exposure to high levels of mold (and some bacterial species) can produce an immune-mediated disease known as hypersensitivity pneumonitis. Clinically, hypersensitivity pneumonitis is known by the variety of occupational exposures that typically cause this disorder (e.g., farmer's lung, woodworker's lung, and malt worker's lung).
- Ingesting (eating) mold toxins can cause disease.
- Proper prevention and management of conditions that can lead to mold growth (e.g., moisture due to leaks or poor design, flooding) are the best means to protect occupant health.

Conclusions on developing clean-up standards for mold include:

- Reasonable guidelines and standards exist for assessment of mold problems in buildings, remediation of mold in buildings, and worker protection.

- The primary reason for a legislative body to consider implementing a regulatory structure for the mold industry is consumer protection.
- A few other states have attempted to regulate the mold industry. Efforts that rely on third party accreditation of standards, guidelines and professionals are felt to be the most successful.

Conclusions on building standards to minimize the risk of moisture problems in Maine buildings include:

- In Maine, there is significantly less available or enforced guidance for residential construction than for school or commercial construction. Further, unlike commercial and school construction that requires work be performed by licensed design professionals, residential construction has no similar controls.
- Homes, schools, and commercial buildings will have *improved* moisture control if constructed in accordance with the Model Building Code *and* the Model Energy Code. However, the code provisions alone are not sufficient to *prevent* moisture problems resulting from design and/or construction techniques.
- Key weaknesses in the codes should be fixed and added as mandatory provisions in the Maine Model Building Codes.
- While a mandatory building code would have a significant positive impact on the quality of Maine building construction, only a voluntary model code has passed successfully through the Legislature.

At its final meeting, the task force conducted a brainstorming session that generated an extensive list of possible actions the state could implement. The following recommendations were identified by those present as being high priorities for State action. These recommendations are expected to have the greatest positive impact on worker health, occupant health and consumer protection while minimizing the need for additional financial resources. It should be noted that all of these recommendations carry some fiscal impact.

Priority Recommendations:

- Maine should publish the availability of guidelines and standards for: 1) the assessment of mold problems in Maine buildings, 2) the remediation of mold contamination from Maine buildings, 3) the education and certification of mold assessment and remediation professionals, and 4) worker protection. Preference should be given to ANSI accredited standards, independent third-party certifications, and federal guidelines. Strategies to communicate the availability of this information to professionals and members of the general public must also be considered. An additional staff position should be created within the Department of Health and Human Services, Maine Center for Disease Control (Maine CDC) specifically to address mold issues.
- Add mandatory moisture control provisions to the Maine Model Building Code, including
 - flashing of all windows and doors;
 - insulation and waterproofing of all basement concrete (walls *and* floor); and
 - placement of vapor diffusion retarders on the warm in winter side of insulation surfaces (e.g., walls, ceilings, and floors)

- In cases where project mold assessment and remediation services are provided by the same company, contractors should be required to provide owners/agents with a signed disclosure statement regarding the potential for conflict of interest in providing both mold assessment and remediation services.
- Tenants rights laws and guidance must be strengthened by requiring mediation between tenants and landlords in mold/moisture disputes, prior to requiring the tenant to pursue legal action against the landlord as is currently the case under the Maine Warranty of Habitability Act, 14 M.R.S.A. § 6021.
- Add a provision to 17 MRSA c. 91 that specifically grants authority to the Local Health Officer for the purpose of investigating mold as a public or private nuisance.
- Maine should add a provision to 10 MRSA c.219-A *Home Construction Contracts* within §1487 that requires contractors performing mold remediation or home construction activities to disclose any training received and certifications held by the project supervisor. An additional Assistant Attorney General position within the Office of the Attorney General could be created and funded to enforce the Home Construction Contract Act and related consumer protection laws with a focus on responding to consumer complaints related to mold assessment, mold remediation, and substandard building construction and renovation.

Additional discussion of each of these recommendations, including rationales, implementation and state fiscal impact, is contained on page 12 of this report.

I. Introduction

During the second regular session of the 122nd legislature, the legislature passed a resolve, L.D. 1971, attached as Appendix A), which was codified as Resolves 2006 Chapter 174, that directed the Maine Department of Health and Human Services (DHHS) and the Maine Department of Environmental Protection (DEP) to convene a task force to review issues regarding mold in buildings in Maine. The resolution clearly identified three specific issues for the task force to review:

1. The current science of mold testing and removal;
2. Consideration of developing clean-up standards for mold; and
3. Consideration of developing building standards to minimize the risk of moisture problems in newly constructed buildings.

The resolution also specified that DHHS and DEP should report back to the Natural Resources and Health and Human Services committees by January 1, 2007. The report should summarize the discussions of the working group and present any recommendations, including any proposed legislation, to address the issue of mold. Finally, the Resolve provided the Natural Resources Committee with the authority to report out legislation during the first regular session of the 123rd legislature.

In order to accomplish these legislative directives, DHHS and DEP contracted with the Maine Indoor Air Quality Council (MIAQC) to provide Task Force Administration. MIAQC is a private non-profit organization dedicated to the improvement of indoor environments in Maine. The Council works to develop and identify best practice guidance to design, build, operate and maintain safe and healthy indoor spaces. The Council further develops education and communications of these principles to both professionals and the public, and has developed a significant amount of foundational policy statements and initiatives to improve how Maine's policy infrastructure addresses indoor air quality.

The Maine Indoor Air Quality Council, in accordance with the legislative directive, issued invitations to key professionals representing key state agencies, private industries, and public health organizations. A complete list of task force participants is included as Appendix B.

The Task Force met on three occasions, on October 30, November 14, and December 19, 2006. All meetings were held in room 319 of the Deering Building in Augusta. Glenn Fellman, Executive Director of the Indoor Air Quality Association, a national organization located in Rockville, MD, participated in the meetings via conference call. Complete minutes of these meetings are included in Appendix C of this report.

In addition to the full task force meetings, three separate subgroups convened via phone or conference call to develop reports and recommendations for full group review. These three subgroups developed discussion agendas and reports on:

- The current science and available research regarding the effect of mold on human health
- Available mold assessment and remediation standards
- Review of building codes and how they address moisture in buildings

MIAQC developed a draft report for review and comment by the task force. This final report was developed in conjunction with DHHS and DEP.

II. Background on Consideration of Mold as a Public Policy Issue

There are the perceptions, real or not, that mold is a serious risk to health; that mold is more of a problem in Maine buildings than it used to be; and that there are very few resources available for members of the public seeking guidance and information. Prior to this Resolve, the Maine Legislature had convened work groups to research and report on mold as an indoor environmental concern. Despite these previous efforts, the State currently does not support any programs to address public concerns with mold in buildings.

A. Mold as a Public Health Issue

Typical public environmental health models focus on the study of how exposure to specific contaminants leads to human disease. Studies of exposures to radon, lead, asbestos and other contaminants have all lead to the development of public health responses to set clearly defined minimum exposure limits as well as strategies to protect and/or prevent health effects from unacceptable levels of exposure.

This model does not apply to mold. Despite many years of extensive research, acceptable levels of mold exposure and subsequent human health response have not yet been determined. There is no scientific data yet available to support policy/regulatory responses similar to those in place for radon, lead, asbestos and other contaminants which may be found indoors.

There is, however, a significant amount of data linking moist environments with respiratory symptoms. Therefore, even though we don't know how much mold is too much mold in the indoor environment, it is agreed that an excessively moist environment is not good for human health.

For the majority of persons, undisturbed mold is not a substantial health hazard. Mold is a greater hazard for persons with underlying conditions such as mold allergies, asthma, and immuno-suppressed conditions. Because there are still many unknowns regarding the effect of long-term mold exposure, emphasis should be on preventing conditions that can lead to mold growth in buildings. If excessive mold growth occurs, there are work practices that can be implemented to safely remediate it.

By far, the vast majority of public concern with mold problems occurs in rental properties. 90% of the mold-related calls received by the Maine Department of Health and Human Services Department are from tenants with mold questions or concerns.

B. The Mold Assessment and Remediation Industry

Currently in Maine, anyone can establish a business to perform microbial (mold) assessment and/or remediation. Proper assessment requires professional skills and education, and effective remediation requires advanced contractor education and experience. Unfortunately, during the years 2000-2002 the industry experienced an influx of poorly qualified or unscrupulous individuals who failed to perform quality assessment and remediation services. Meanwhile, during this same period many states saw an enormous increase in mold-related insurance claims. The insurance industry covered these claims until the end of 2002, when many insurance companies ceased providing mold-related property coverage, established a cap on coverage limits, or sold mold policies to customers for an additional premium.

The "mold rush" of 2000-2002 resulted in the creation of several new for-profit and non-profit organizations seeking to train and certify in assessment and remediation. Some of these offer

inadequate 1-2 day training classes and award certification to attendees regardless of prior experience or education..

Conversely, professional quality education and certification programs do exist, and include:

- Both the American Industrial Hygiene Association (AIHA) and the American Conference of Governmental Industrial Hygienists (ACGIH) have greatly increased available training programs in microbial assessment for certified industrial hygienists. Prior to this year, the ACGIH program was among the only programs for indoor environmental professionals to be third-party accredited. The ACGIH program is conducted by the American Board of Industrial Hygiene and is accredited by the Council for Engineering and Scientific Specialty Boards (CESB).
- In January of 2006, the non-profit American Indoor Air Quality Council (IAQ Council) was awarded CESB accreditation for its Certified Indoor Environmental Consultant (CIEC) program. In 2007 the IAQ Council has applied for accreditation of its certification programs for those who perform microbial assessment and microbial remediation. The IAQ Council also recently launched a certified apprentice program for entry-level persons in the industry.

These certification programs meet rigorous third-party accreditation standards, as well as the American Society for Testing and Materials (ASTM) standards for conducting certification programs for professionals and contractors. The existence of these programs and their success in attracting large numbers of qualified individuals provides consumers with a method of distinguishing qualified consultants and contractors from those with limited training, inadequate experience and dubious credentials.

C. Regulatory Initiatives

There have been numerous efforts to license and/or regulate the mold remediation industry. Only two states, Texas and Louisiana, have passed laws in this area, both of which stemmed from consumer protection concerns. Texas' program requires state-approved training and state administration of state-developed licensure exams. Although this program was expected to be self-supporting through license fees, the number of licensees is fewer than anticipated and the program is a financial burden to the state.

Louisiana's program allows individuals who had received training and certification from a reputable non-profit organization to be waived from regulatory requirements in the areas of training and testing. The state was very selective in determining which voluntary programs would qualify. Louisiana further neglected to account for disaster planning. In the aftermath of Hurricane Katrina, the regulatory requirements have prevented access to outside professional help when outside professional help was needed most.

A third state, Florida, has come close to adopting mold remediation legislation. Florida's bill, passed by the legislature, would have allowed individuals holding certifications from third-party accredited, non-profit organizations meeting ASTM standards to be qualified to receive licensure by the state. This strategy would have meant that Florida would not have to support the burden of training and testing that Texas struggles to maintain. Florida's Governor vetoed the bill out of concern that existing mold remediation companies would be put out of business.

Connecticut and New York have opted to develop their own state guidelines, primarily "endorsing" existing independent, third-party accredited standards and professional certifications. They do not directly regulate the mold industry. These guidelines are not deemed to be regulations. It is too early to

tell what, if any, impact the endorsement of specific protocols by a state will have on the industry. The Maine task force, however, felt this strategy has some merit; the new *Connecticut Guidelines for Mold Remediation Contractors* is available on the internet at www.dph.state.ct.us/BRS/EOHA/mold_problems.htm. A copy of the Connecticut legislation and the Connecticut Department of Health mold information webpage are included in Appendix G.

In the states where regulations and/or standards of practice for these industries have been made into law, the need for legislation stemmed from consumer protection concerns. Consumers need a way to distinguish qualified professionals and contractors, and be confident they are working to established standards and protocols. States considering a regulatory structure to protect consumers from fraudulent practice by assessment and remediation contractors can rely on certifications managed by reputable organizations that undertake the training, testing, and accreditation of the professional community. Significant financial resources are required to develop a state-run program, and the work would be redundant of much that is already offered by independent third-party professional organizations.

In relation to work protection, the Occupational Safety and Health Administration (OSHA), the federal agency that develops standards and guidelines to protect worker health and safety, does not have a standard for mold because of the difficulty in setting acceptable exposure limits. OSHA does have published workplace guidelines that emphasize prevention of conditions (e.g., chronic moisture) that can lead to mold growth and subsequent employee exposures. The American Society of Safety Engineers (ASSE) is currently developing a work practice standard (for ASTM accreditation) to protect the health and safety of mold assessment and remediation professionals.

Mold is also an issue for the insurance industry. Most property insurance policies provide some mold coverage, although that coverage is often limited and does not include ground water intrusion or damage from relative humidity problems.

III. Consideration of Developing Clean Up Standards for Mold

Clean-up standards for mold include standards and guidelines for assessment of mold problems in buildings, remediation of mold in buildings, and worker protection. Because mold is naturally occurring and ubiquitous, and health-based levels cannot be established, effective standards are necessarily focused on training and work practices. Such standards may be implemented through a regulatory (licensing) structure and/or through enforcement of professional best practices under consumer protection law.

In the last four years, and particularly in the last twelve months, significant progress has been achieved in the development of quality industry assessment and remediation standards. The industry now has a broad array of documents available for the proper assessment and remediation of mold problems in buildings. The industry also has a variety of good quality, independent, third-party professional certifications for the education and certification of assessment and remediation professionals.

- The American National Standards Institute (ANSI) has accredited standards of practice for those who perform microbial assessment.
- A variety of standards of practice for those who perform microbial remediation have been developed. Several of these will be ANSI accredited within the next year.

- The federal government (OSHA) has published a guideline to protect those who perform mold assessment and remediation services. ANSI accredited standards are expected within the next 2-3 years.
- Mold assessment and remediation guidelines made available by government agencies have improved vastly in the last four years. New guidance documents on microbial issues from the U.S. EPA address maintenance and prevention, assessment, and remediation. Several additional EPA guidance tools, including sophisticated software, are also available and under development.

Glenn Fellman provided the task force with a thorough summary of existing standards and guidelines for mold assessment, remediation, and worker safety, including a complete list of the available standards and guidelines for the assessment and remediation of mold, as well as protection for remediation professionals (Appendix D).

Task force discussions reflected that ANSI-approved standards are preferred for use in Maine, as the ANSI accreditation process provides verification that the standards and guidelines represent true consensus on best practices for the industry. Currently, ANSI has accredited standards for mold assessment in commercial buildings (ASTM E-2418-06), and for water damage restoration (Institute for Inspection, Cleaning and Restoration Certification Standard S500).

For topic areas in which ANSI-approved standards are not available, preferred standards and guidelines are those that are in development and intended for ANSI approval. Currently these include: the Indoor Environmental Standards Organization's standard for microbial assessment for residential real estate transactions; the mold remediation standard of the Institute for Inspection, Cleaning and Restoration Certification; the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) standard for inspection and maintenance of commercial HVAC systems; the Air Conditioning Contractors of America's standard for residential HVAC system cleaning, and the Guidelines for Mold and Fungi Control and Remediation for Worker Protection in Indoor Work Environments (ASSE) .

Finally, for assessment, remediation and worker protection topics for which no ANSI-accredited standard exist or are under development (assessment in residential buildings), the EPA, OSHA, NY and CT state-developed guidelines are the most up-to-date references that may be utilized.

IV. Consideration of developing building standards to minimize the risk of moisture problems in newly constructed buildings.

Building codes are minimum construction guidelines designed to ensure life and fire safety and prevent structural degradation in buildings. Building codes are viewed as an extremely valuable tool to ensure that building occupants have reduced risk of personal injury and adverse health effect from building-failure events and/or exposure to indoor pollutants.

The following summary addresses new construction only. The task force did not address existing construction its discussions of building code discussions..

A. Brief History of Maine's Model Building Codes

Over the past few years, Maine’s legislature has worked hard to develop a set of model building codes for use by municipalities that choose to implement a building code program. A Building Codes Working Group was formed, and participants represented a broad spectrum of state and local government officials, building-related professionals, and other interested groups. At the recommendation of the Building Codes Working Group, the Maine legislature adopted a series of model codes:

- The *Maine Model Building Code* (10 MRSA §9701) includes the International Residential Code (IRC) for new residential construction, the International Building Code (IBC) for new commercial construction, and the International Existing Building Code (IEBC) for existing building rehabilitation. Existing life safety and ventilation provisions for commercial buildings were not affected by the model building code.
- The *Maine Model Building Energy Code* (35-A MRSA §121) includes the International Energy Conservation Code (IECC), as well as standard 62.2 for new residential construction. Existing life safety and ventilation provisions for commercial buildings were not affected by the model building energy code.

Maine’s model building codes are voluntary. Municipalities are not required to adopt a building or energy code. However, if they choose to adopt a building or energy code, they must adopt the model codes. Further, the model building code is amendable by municipalities.

B. Application of Codes and Standards to Various Types of Construction in Maine:

Schools. Because most public schools in Maine are constructed using some State funds, the Maine Bureau of General Services requires that all schools be constructed in accordance with the International Building Code. Maine schools have additional requirements to comply with the ASHRAE 62 ventilation standards, and exceed the energy efficiency requirements of the ASHRAE 90.1 energy standard. Building design and engineering is further required by Maine-licensed professionals.

Commercial Construction. New commercial construction in Maine must comply with the ASHRAE 62 ventilation standard and the ASHRAE 90.1 energy standard, regardless of whether or not that building is constructed in a municipality that has voluntarily adopted a building code. In addition, the professional design and construction community, through attention to professional liability, operates somewhat under a self-policing mechanism to insure that buildings are constructed in accordance with generally accepted “minimum acceptable practice” principles. Building design and engineering is further required by Maine-licensed professionals.

Homes. Unless a home is constructed in a municipality with an adopted building code, there are no codes or standards, or professional licensing/certification infrastructure, to insure that a home is built in accordance with generally accepted “minimum acceptable practice” principles. The exception is that multi-family housing must comply with the ASHRAE 62.1 or 62.2 ventilation standard.

C. Moisture (and therefore Mold) Control in Maine Construction

There are two primary strategies for preventing mold and moisture in Maine buildings:

- 1) prevent moisture from getting into a building; and
- 2) provide a mechanism (both structural and mechanical) for moisture to get out of a building..

For new construction, the 2003 IRC addresses bulk water control through the building shell fairly well. However, the code does not state that moisture control is one of the goals of the code. Specifically, the IRC does not require flashing around doors and windows. Also, the code does not address moisture issues due to condensation on ground-contact concrete, on water supply lines, or on water-using appliances such as toilets. The Maine Center for Disease Control (Maine CDC), formerly the Maine Bureau of Health, receives hundreds of calls each month from Maine residents with mold problems stemming from both of these issues. 90% of these calls are from residents in landlord/tenant situations. The incidence of mold contamination in newly constructed Maine homes and apartments can be greatly reduced by amending the Maine Model Building Code to address these moisture control deficiencies.

A lesser problem, but again one not addressed in this code, is control of water vapor through the building shell. There is some mention in places of installing a moisture barrier on the winter-hot side of wall and ceiling insulation, but that is all. More attention could be paid to air movement through the shell and between conditioned and un-conditioned spaces. These uncontrolled air movements can create tremendous mold problems in wall cavities and attics. Amendments to the Maine Model Building Code could address these issues.

The IECC contains some of the moisture control references that the IRC does not, specifically, references to sealing around windows and doors (but *not* flashing), and installation of vapor barriers (sometimes referred to as vapor retarders) on the winter-hot side of the wall structure. The IECC also contains references for foundation wall insulation, but not foundation *floor insulation*.

In summary, homes, schools, and commercial buildings will have *improved* moisture control if constructed in accordance with the Maine Model Building Code *and* the Maine Model Building Energy Code. However, the current code provisions are *not* sufficient to *prevent* moisture problems resulting from poor construction technique or design. Key weaknesses in the codes for Maine can be corrected by adding:

- Mandatory flashing of all windows and doors;
- Mandatory insulation and waterproofing of basement concrete (walls *and* floor); and
- Proper placement of vapor diffusion retarders on warm side of wall construction (in winter.)

To ensure that provisions critical to moisture control in Maine buildings are implemented consistently, these moisture provisions of building codes should be added as mandatory, unamendable provisions when adopted by a municipality.

In regards to ventilation, MIAQC conducted a brief review of the building codes and standards contained in Maine's model code family and concluded that ventilation requirements for Maine schools and commercial buildings are adequate. The ANSI-accredited ASHRAE standards 62.1 and 62.2 are acceptable minimum construction practices to ensure adequate ventilation to prevent moisture build-up. Ventilation requirements for homes are sufficient only if a municipality has adopted the model energy code.

V. The Current Science of Mold and Health

As directed by the Resolve, the task force reviewed the current science of mold testing and removal. Familiarity with the current science of mold testing and removal is needed to understand how to address the health concerns of occupants in buildings with mold and/or moisture problems. This section addresses specifically the available research and guidance on the effect of dampness and mold on human

health. This guidance is the foundation of most of the assessment, remediation, and worker protection guidance referenced earlier in this report

In 2003, the MIAQC adopted a policy statement on mold exposure (Appendix E). After a thorough review of available research and literature completed since the MIAQC's policy statement was adopted, the task force determined that the original MIAQC statement is still an accurate reflection of what we know about the effect of mold on human health. A summary of the literature reviewed is contained in Appendix F to this report.

Key excerpts of the MIAQC statement which are relevant to the work of this task force follow.

- Scientific studies of inhalation (breathing) mold exposures in the indoor environment have documented the following health effects in susceptible individuals:
 - Simple irritant effects (itchy eyes, runny nose, headaches).
 - Allergies in susceptible individuals (it is not known in the general population how much exposure or for how long is required to cause allergy; 5-10% of the population may be mold allergic).
 - Exacerbation of asthma (a link between mold and the development of asthma has not been established).
 - Infections in individuals with suppressed immune systems (the molds that cause infection in healthy individuals are not typically found indoors).

- Serious health effects from inhalation exposure to mold in the indoor environment (e.g., toxic reactions, infectious diseases, and chronic irritation) have not been well characterized. Toxic effects of mold have only been demonstrated following experimental exposures in animal studies and studies involving ingestion (eating) of contaminated foods.

- Additional health research is needed to better characterize the nature and scope of the health effects caused by indoor exposure to certain, specific molds. Particular attention should be given to the possible role of mold in producing serious, short-term or long-term effects on respiratory, immune, and nervous systems.

- Since the research to characterize the effect of mold on human health is not fully developed, it is prudent to take precautionary measures, where practical, to prevent the growth of mold in the indoor environment.

VI. Recommendations

During its final meeting on December 19, the Task Force engaged in a lengthy brainstorming session to identify potential strategies aimed at addressing mold issues in Maine buildings to present to the 123rd Maine Legislature. The session generated a variety of options the state could consider to address how to better prevent mold and moisture problems in Maine buildings, as well as how to manage the mold assessment and remediation industry.

Members of the task force were provided with the opportunity to “vote” for their top strategies. These votes were tallied and discussed, and resulted in the development of priority recommendations. Using these as a guide, the Departments present the following recommendations for legislative consideration:

1) State Publication of Credible Guidelines and Standards.

Maine should publish available guidelines and standards for: 1) the assessment of mold problems in Maine buildings, 2) the remediation of mold contamination from Maine buildings, 3) the education and certification of mold assessment and remediation professionals, and 4) worker protection. Preference should be given to ANSI accredited standards, independent third-party certifications, and federal guidelines. Strategies to communicate the availability of this information to professionals and members of the general public must also be considered. An additional staff position should be created at the Maine CDC specifically to address mold issues.

Rationale: Professionals and members of the general public have little or no public resources available to them to assist them with their mold and moisture problems. The sheer number of standards and guidelines that can be found on the internet is daunting, and there is little to guide the consumer towards credible, well-grounded resources. Maine state publication of credible guidance documents would greatly assist individuals looking for quality mold assessment and remediation professionals and proper practices for the assessment and remediation of mold in their homes and buildings.

Fiscal impact: One FTE. Currently, there are no positions within Maine state government to address issues of mold/mildew in Maine buildings. It is clear, however, that fiscal resources are currently being taken away from existing programs in order to address inquiries from the public on mold issues. Hundreds of calls are received and managed every month by state staff with no resources to support that expense, to the detriment of their designated programs. The state needs to allocate resources to respond to public inquiries, to review the credible guidelines and standards referenced in this report to determine their appropriateness for publication in Maine, and to implement communications strategies, such as website development, to make the information available to the public at no or low-cost.

2) Fix moisture control provisions of Building Codes

Add mandatory moisture control provisions to the Maine Model Building Code, including flashing of all doors and windows, insulating and waterproofing basement concrete (walls and floors), and placement of vapor diffusion retarders on warm side (in winter) of insulation.

Rationale: Key moisture control provisions are lacking in Maine's Model Building Codes. These provisions should be added as mandatory provisions to the Model Codes. Constructing buildings with proper moisture control is necessary to reduce the risk of subsequent mold problems.

Fiscal Impact: Minimal to the state. Municipalities would bear the full burden of enforcement should they choose to adopt the Model Code(s).

3) Conflict of Interest

In cases where project mold assessment and remediation services are provided by the same company, contractors should be required to provide owners/agents with a signed disclosure statement regarding the potential for conflict of interest in providing both mold assessment and remediation services.

Rationale: Consumers should be aware that companies providing both assessment and remediation services do have inherent conflict of interest. Provision of a written disclosure of potential conflict of interest by the contractor to the building owner or agent will help to prevent fraudulent practices.

Fiscal impact: Minimal.

4) Strengthen Tenants Rights

Tenants rights laws and guidance must be strengthened by requiring mediation between tenants and landlords in mold/moisture disputes, prior to requiring the tenant to pursue legal action against the landlord as is currently the case under the Maine Warranty of Habitability Act, 14 M.R.S.A. § 6021.

Rationale: Under current statute, tenants engaged in a dispute with a landlord over mold/moisture issues have little or no recourse other than to initiate litigation. This can be a hardship for many tenants, particularly the elderly or those with small children. (Based on the mold-related calls received by Maine CDC, the preponderance of tenants who call the State looking for assistance for mold issues are elderly, have a debilitating disease, or have small children.)

Fiscal Impact: Reduced cost for landlords/tenants to resolve disputes, reduced cost of bringing these types of complaints through the Maine court system, and reduced cost to state agencies, because tenants have alternative to resolve their disputes in lieu of contacting state government for assistance.

5) Strengthen Authority of Local Health Officers.

Add a provision to 17 MRSA c. 91 that specifically grants authority to the Local Health Officer for the purpose of investigating mold as a public or private nuisance.

Rationale: Consumers often look to their municipality to assist them with their mold/moisture problems, particularly those in landlord/tenant situations. Specifically granting authority to local health officers to investigate mold/moisture problems in homes and buildings will provide consumers with some recourse for getting their nuisance mold problem investigated, and subsequently resolved.

Fiscal impact: Minimal cost to municipalities. Reduced cost to state agencies, because tenants have alternative to resolve disputes via municipality in lieu of state government.

6) Amend Home Construction Contract

Maine should add a provision to 10 MRSA c.219-A *Home Construction Contracts* within §1487 that requires contractors performing mold remediation or home construction activities to disclose any training received and certifications held by the project supervisor. An additional Assistant Attorney General position within the Office of the Attorney General should be created and funded to enforce the Home Construction Contract Act and related consumer protection laws with a focus on responding to consumer complaints related to mold assessment, mold remediation, and substandard building construction and renovation.

Rationale: Consumers should have a reasonable means to determine whether or not a contractor is qualified to perform requested services. Disclosure of training and certifications held by project supervisor will assist consumers in making well-reasoned determinations. The Maine Office of the Attorney General currently does not have adequate staffing to address the significant volume of consumer complaints related to substandard construction, renovation, or mold assessment/remediation practices.

Fiscal impact: One FTE.

7) Additional Recommendations.

Shown below are some additional recommendations generated by the task force. Although not included in the above list of priority recommendations, they do have merit as feasible options to address mold/moisture problems in the state.

Additional recommendations relative to the science of mold and health:

- Maine should establish a system to track mold claims and calls to better define potential risk to health. Rationale: Maine currently has no mechanism to identify the extent of mold problems faced by Maine residents, their effect on public health, or the cost to the state to address them.

Additional recommendation on mold assessment, remediation, and worker protection guidelines to protect occupant/worker health, and prevent fraudulent practices:

- Maine should implement a state registry of independent, third-party accredited assessment and remediation professionals. Rationale: provides the public with a credible resource to find qualified, adequately trained professionals to help them address their mold problems.

Additional recommendations on preventing mold/moisture problems in buildings through improved building codes/standards:

- Add moisture prevention techniques for cold climates to mandatory curriculum for building trades programs (design, building, engineering) at Maine community colleges and universities Rationale: increase awareness in our future building professionals of the need to design, construct, operate and maintain Maine buildings to prevent moisture problems.
- Add building commissioning processes to Maine Model Building Codes. Rationale: Building Commissioning is a systematic process for achieving, verifying, and documenting that the performance of a building and its various systems meet the design intent and the functional and operational needs of the owners and occupants. Commissioning ensures that each building occupant is provided with the proper amount of good quality air delivered on a consistent basis, ensures that thermal and moisture conditions of the interior air are not conducive to biological growth, ensures that the building is maintainable, and ensures that the building systems are well documented and their operation understood by the owner and occupant.
- Consider mandatory building codes and licensing or registration of building contractors. Rationale: while expensive to implement, mandatory codes and licensing/registration of building contractors is a very effective mechanism to both prevent moisture-related problems in newly constructed buildings as well as protect the public from substandard or fraudulent construction practices.

Additional recommendations to better protect Maine consumers:

- Require disclosure of moisture/mold problems prior to real property transfer or lease. Rationale: provides potential buyers with adequate information on the potential for mold problems in a home.
- Create an optional section of the state model construction contract that has mold assessment/remediation specifications. Rationale: While Maine's model home construction contract can be used for mold assessment/remediation specifications, it is not a perfect fit. Example: mold remediation contractors providing "cleaning" services to address nuisance mold problems are not considered under the current model construction contract language.

Appendices

- A. *Resolve, Directing a Review of Clean-up and Minimization Standards for Mold*
- B. List of Task Force Participants
- C. 2006 Maine Mold Task Force Meeting Notes
 - 1. October 30, 2006
 - 2. November 14, 2006
 - 3. December 19, 2006
- D. Table of Existing Standards
- E. MIAQC Policy Statement on Mold Exposure
- F. Subgroup Reports
 - 1. Available Research and Guidance on the Science of Mold and Health
 - 2. Building Codes
 - 3. Occupational Health Standards for Mold
 - 4. Maine Insurance Mold Facts
 - 5. Real Property Considerations
- G. Connecticut Legislation Directing Development of Connecticut Guidelines for Mold Abatement Contractors, and Copy of Connecticut Department of Health Mold Resource Web Page

Appendix A: Resolve, Directing a Review of Clean-up and Minimization Standards for Mold

RESOLVES Second Regular Session of the 122nd

CHAPTER 174 H.P. 1381 - L.D. 1971

Resolve, Directing a Review of Clean-up and Minimization Standards for Mold

Sec. 1. Review by Department of Environmental Protection and Department of Health and Human Services, Maine Center for Disease Control and Prevention. Resolved: That the Department of Environmental Protection and the Department of Health and Human Services, Maine Center for Disease Control and Prevention, jointly referred to in this resolve as "the departments," shall convene a working group to review issues regarding mold in buildings in the State. Membership in the working group must include representatives of the Department of Administrative and Financial Services, Bureau of General Services, the Department of Education and the Department of Labor as well as the departments. The departments shall invite representatives of the following interested parties to participate as members of the working group: the Maine Indoor Air Quality Council, an environmental laboratory, the building and construction industry and other interested parties as determined by the departments; and be it further

Sec. 2. Issues to be reviewed. Resolved: That the departments shall include in the review under section 1 the following:

1. A review of the current science of mold testing and removal;
2. Consideration of developing clean-up standards for mold; and
3. Consideration of developing building standards to minimize the risk of moisture problems in newly constructed buildings; and be it further

Sec. 3. Report. Resolved: That, no later than January 1, 2007, the departments shall report to the joint standing committees of the Legislature having jurisdiction over natural resources matters and health matters on the review under section 1. In the report, the departments shall summarize the discussions of the working group and present any recommendations, including any proposed legislation, to address the issue of mold; and be it further

Sec. 4. Authority to report out legislation. Resolved: That the joint standing committee of the Legislature having jurisdiction over natural resources matters may report out legislation to the First Regular Session of the 123rd Legislature pertaining to the cleanup and minimization of mold.

Appendix B: List of Task Force Participants

Participant Name	Participants Company or Affiliation	City
Robert Stilwell	DHS Division of Health Engineering	Augusta
Brant Miller	AWM Engineering	Gorham
Dennis Kingman	Summit Environmental Consultants, Inc.	Bangor
Clough Toppan	DHS Division of Health Engineering	Augusta
Dale Siulinski	Maine Department of Labor	Augusta
Gene Kaler	Maine Bureau of General Services	Augusta
Norman Anderson	American Lung Association of Maine	Augusta
Ivan Most	Strategic Occupational Health Management, Inc.	Old Orchard Beach
Mark Hyland	Maine Department of Environmental Protection	Augusta
Carole Cifrino	Maine Department of Environmental Protection	Augusta
Rep. Margaret Craven	Representative, House District 74	Lewiston
Frank Kimball	Maine Bureau of Insurance	Augusta
Glenn Fellman	Indoor Air Quality Association	Rockville, MD
Brett Goodrich	Northeast Laboratory Services	Waterville
Ed Antz	Maine Department of Education	Augusta
Margaret Stern	Stern & Stern	Wiscasset
Christine Crocker	Maine Indoor Air Quality Council	Augusta
Charles Soltan	Attorney at Law	Augusta
Rick Karg*	RJ Karg & Associates	Topsham
Bill Turner*	Turner Building Science	Harrison
David Hart*	HL Turner Group, Inc.	Harrison
David Johnston*	Builder	Gorham
Greg Roberts*	Design Concepts, Inc.	Fairfield

* = provided review/research only

Appendix C: 2006 Maine Mold Task Force Meeting Notes

Appendix C-1: October 30, 2006 Meeting Notes



P.O. Box 2438, Augusta, Maine
04338

Telephone: 207/626-8115

Fax: 207/626-9015

E-Mail: miaqc@gwi.net

Meeting of the Task Force to Study Mold in Maine Buildings

(Resolve LD 1971)

Monday, October 30, 2006

2:00 p.m. to 5:00 p.m.

Room 319 of the Deering Building, Augusta

-MINUTES-

Present: Norman Anderson; Ed Antz; Carole Cifrino; Margaret Craven; Christine Crocker; Glenn Fellman*; Mark Hyland; Gene Kaler; Frank Kimball; Dennis Kingman; Larry Mare; Brant Miller; Ivan Most; Dale Siulinski; Margaret Stern; Bob Stilwell

* = Present via conference call.

Key Action Outcomes of the Meeting:

1. **Norman Anderson and Ivan Most agreed to prepare a draft of this section of the report for presentation to the group at its next meeting on November 14th.**
2. **A subgroup to consider mold cleanup options comprised of: Glenn Fellman, Brant Miller, Frank Kimball, Dale Siulinski, and Carole Cifrino was designated to prepare a matrix of issues and options for the full group to review at its next meeting on November 14th. The matrix should include whether or not various options would achieve intended goals.**
3. A subgroup was formed to research all issues related to moisture incursion and prepare a summary to bring back to the group at large. This report should be ready in advance of the third meeting of the Task Force in December. Members of the subgroup are: Bob Stilwell; Gene Kaler; Dennis Kingman; Ed Antz; and Mark Hyland. The group will be convened via conference call.
4. Frank Kimball offered to research availability of insurance industry data re: mold/moisture claims in Maine buildings.

The meeting was called to order at 2:00 p.m.

Item 1. Introductions

Facilitator Ivan Most welcomed everyone to the meeting. Those present introduced themselves and noted their professional affiliations and interest relative to the subject of mold in Maine buildings.

Item 2. Review Legislative Resolve; Process to Achieve Legislative Directives

Margaret Craven (Maine Representative, bill sponsor) provided a brief history of LD 1971:

- The original bill was initiated by constituent concerns in a workplace environment.
- Constituent concerns in other types of indoor environments (homes, apartments, schools) have also been brought to her attention
- Perception: mold problems in buildings is more prevalent now than it used to be
- Perception: there are very few resources available to address the issues
- Because of the complexity of policy issues on mold, the bill was passed as a resolve. The task force that is convened at this meeting is a direct result of the legislative resolve.
- The task force has been charged with a study/review of three key issues:
 - A review of the current science of mold testing and removal;
 - Consideration of developing clean-up standards for mold; and
 - Consideration of developing building standards to minimize the risk of moisture problems in newly constructed building
- The task force must generate a report to present to the Committee by January 1, 2007.

Discussion by group:

- The three directives contained in the resolve are the key issues to be addressed by the task force.

Consensus on Process to achieve these three directives:

- At the conclusion of each of the three scheduled task force meetings, sufficient background material and detail will be presented to develop each section of the report. Therefore:
 - At the conclusion of today's meeting, sufficient background material and detail will have been presented/discussed to develop the science and research directive
 - At the conclusion of the November 14 meeting, sufficient background material and detail will have been presented/discussed to develop the remediation standards (and licensing) directive
 - At the conclusion of the December 19 meeting, sufficient background material and detail will have been presented/discussed to develop the building standards/moisture control directive

Item 3. Background Policy

Brant Miller, (Engineer, Chair of MIAQC Policy Committee), provided a brief history of the Maine Indoor Air Quality Council, its diverse membership, its general process to develop peer reviewed, scientifically based guidance on key IAQ issues, and development of MIAQC policy relative to the presence of mold in indoor environments.

Brant reviewed specifically the Council's policy statement on Mold Exposure that expresses the MIAQC's fundamental philosophy and approach to the issues faced by the Task force. Key points of the policy statement:

- There is a lot we do know about mold: how and why it grows; its ubiquitous nature; and its general affect on human health;
- There is a lot we don't know about mold: no clear linkage to more serious health effects; inability to set clearance standards;
- Emphasis on preventive principle: since there is still a lot not known about mold, emphasis should be on preventing those conditions that cause mold to form in indoor environments

Item 4. Former Legislative and Task Force Efforts

Norman Anderson presented a review of legislative and other efforts that have helped to shape efforts to address indoor air quality in Maine in general, and schools in particular.

- In the mid-90's a national study highlighted the poor environmental conditions in U.S. educational facilities. A subsequent report of Maine educational facilities issued by the University of Maine validated the national findings.
- The Maine Department of Education embarked on a successful campaign to improve Maine school facilities generally. The state has since dedicated millions of dollars to new school construction, implementation of the Revolving Renovation Fund, and implementation of a Facilities Management Template
- There are very few other states that have been as pro-active as Maine in addressing indoor air quality in its public and private buildings. Emphasis has been and continues to be: designing, building, and maintaining buildings properly is the best recipe to prevent mold problems, and the best method to prevent the risk of adverse health effect.
- Several other legislative initiatives have popped up in the last 5-6 years:
 - A bill before the legislature in 1999-2000 resulted in a year-long study of school air quality. The report, presented to the legislature in 2001, focused on implementation and enforcement of existing statutory infrastructures to address design, construction, and maintenance of school facilities, and increased dediction of state resources to achieve these goals.
 - Following this effort, the Maine Department of Education continued to review the report's findings. Their work emphasized development of a systems approach for prevention of IAQ problems in school facilities and identified a need for ongoing resources within the Maine Department of Education and the Maine Bureau of General Services to manage problems
 - Two years ago, the Maine Department of Education and the Maine Department of Education were asked to review problems associated with the presence of toxic chemicals in schools. That effort resulted in a written report to the legislature, and a request for resources to conduct school chemical clean-outs.
 - To date, financial resources have not been allocated to any of these identified areas of concern/need.

Item 5. How Mold Differs From Other Indoor Contaminants; Latest Literature and Science

Ivan Most and Norman Anderson jointly presented the issue of how mold differs from other types of indoor contaminants.

- Typical public environmental health models focus on the study of how exposure to specific contaminants leads to human disease. Studies of exposures to radon, lead, asbestos and other contaminants have all lead to the development public health responses to set clearly defined minimum exposure limits as well as strategies to protect and/or prevent health affect from unacceptable levels of exposure.
- This model does not apply to mold. Despite many years of extensive research, acceptable levels of mold exposure and subsequent human health response have not yet been determined. There is no scientific data yet available to allow policy/regulatory responses similar to those in place for radon, lead, asbestos and other contaminants that can be found indoors.
- What is available, however, is a lot of data linking moist environments with respiratory symptoms. Therefore, even though we don't know how much mold is too much mold in the indoor environment, it can be agreed that a moist environment is not good for human health.
- This lack of scientific knowledge leads again to the precautionary principle: we know why mold grows in buildings, therefore efforts should be taken to prevent it. And, if mold growth occurs, we have developed acceptable methods to safely remove it.

Group discussion:

It was the consensus that there was sufficient information available to the group at large to address the first legislative directive on the science of mold. **Norman Anderson and Ivan Most agreed to prepare a draft of this section of the report for presentation to the group at its next meeting on November 14th.**

Item 6. Mold Standards, Certifications, and Nationwide Efforts

Glenn Fellman, Executive Director of the Indoor Air Quality Association, provided an extensive review of available mold remediation standards, and efforts nationwide to regulate the mold remediation industry.

- In the last four years, and particularly in the last twelve months, significant progress regarding development of quality industry remediation standards has been achieved:
 - ANSI-accredited standards of practice for those who perform microbial assessment have been established by ASTM International, including E2418-06 *Standard Guide for Readily Observable Mold and Conditions Conducive to Mold in Commercial Buildings*
 - The Institute of Inspection, Cleaning and Restoration Certification (IICRC) became an ANSI-accredited standards making body. IICRC's standard S500, *Standard and Reference Guide for Professional Water Restoration* was subsequently approved by ANSI. IICRC's standard S520, *Standard and Reference Guide for Professional Mold Remediation* recently went through a public peer review and is expected to be submitted for ANSI approval within 3 to 6 months.

- The Indoor Environmental Standards Organization (IESO) became an ANSI-accredited standards making body. IESO has established standards used by residential home inspectors to determine the presence of unacceptable levels of microbial contamination during home inspections for real estate transactions. IESO is now preparing to release its standards for public review, and will subsequently seek ANSI approval of its standards.
- Additional standards addressing maintenance, prevention, and remediation of microbial contamination in HVAC systems are now being created by the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) and the Air Condition Contractors of America (ACCA). Both organizations are ANSI accredited standards-making bodies.
- The guidelines made available by government agencies have improved vastly in the last four years. New guidance documents on microbial issues from the U.S. EPA address maintenance and prevention, assessment, and remediation. Several additional EPA guidance tools, including sophisticated software, is also available and under development.
- There have been numerous efforts to license and/or regulate the mold remediation industry. Only two states have passed laws, both of which stemmed from consumer protection concerns.
 - Texas' program requires state-approved training and administers state-developed licensure exams. Because the number of licensees is fewer than anticipated, the program is a financial burden to the state. (it's original intent was for self-funding)
 - Louisiana's program allows individuals who had received training and certification from a reputable non-profit organization to be waived from regulatory requirements in the areas of training and testing. The state was very selective in determining which voluntary programs would qualify. Louisiana further neglected to account for disaster planning. In the aftermath of hurricane Katrina, the regulatory requirements have prevented access to outside professional help when outside professional help was needed most.
 - A third state, Florida, has come close to adopting mold remediation legislation. Florida's bill, passed by the legislature, would have allowed individuals holding third-party accredited, non-profit organizations meeting ASTM standards to be qualified to receive licensure by the state. This strategy would have meant that Florida would not have to support the burden of training and testing that Texas struggles to maintain. Florida's Governor vetoed the bill out of concern that existing mold remediation companies would be put out of business.
- In just the past twelve months, there has been significant improvement in the availability of training and certification programs that meet rigorous third-party accreditation standards, as well as ASTM standards for conducting certification programs for professionals and contractors. The existence of these programs and their success in attracting large numbers of qualified individuals provides consumers with a method of distinguishing qualified consultants and contractors from those with limited training, inadequate experience and dubious credentials. Specifically:

- Both the American Industrial Hygiene Association (AIHA) and the American Conference of Governmental Industrial Hygienists (ACGIH) have greatly increased available training programs in microbial assessment for certified industrial hygienists. Prior to this year, the CIH program was among the only programs for indoor environmental professionals to be third-party accredited. The CIH program is conducted by the American Board of Industrial Hygiene and is accredited by the Council for Engineering and Scientific Specialty Boards (CESB).
- In January of 2006, the non-profit American Indoor Air Quality Council was awarded CESB accreditation for its Certified Indoor Environmental Consultant (CIEC) program. In 2007 the IAQ Council has applied for accreditation of its certification programs for those who perform microbial assessment and microbial remediation. The IAQ Council also recently launched a certified apprentice program for entry-level persons in the industry.

Group Discussion:

- No cold climate states have attempted to regulate the mold remediation industry
- Glenn can make the Florida legislation available to the Maine Task Force
- Glenn can make IAQA's overall legislative matrix available to the Maine Task Force
- Federal efforts to adopt legislation (the Conyers bill) have failed
- Two states (Hawaii and one other...) have developed conflict of interest rules to protect consumers. Such provisions prevent mold assessment providers from subsequently doing the mold remediation work.
- Group at large curious about efforts internationally, particularly in Scandinavia, to regulate the mold remediation industry
- A wide variety of professions will ultimately have an interest in any efforts to regulate the mold remediation industry, including: lenders, insurers, builders, realtors, air duct cleaners, carpet cleaners, flood abatement professionals, property inspectors.
- A summary of these issues or a matrix of options would be useful to the group at large to comprehensively address the task force's legislative directive for mold remediation standards. **A subgroup comprised of: Glenn Fellman, Brant Miller, Frank Kimball, Dale Siulinski, and Carole Cifrino was designated to prepare a matrix of issues and options for the full group to review at its next meeting on November 14th. The matrix should include whether or not various options would achieve intended goals.**

Item 7. Moisture Issues in Building Construction

Bob Stilwell serves as the IAQ coordinator for the state of Maine. He is the primary administrator of the state Radon program, and fields numerous phone calls from the general public looking for answers to general IAQ questions. Bob presented the following summary of calls relative to mold/moisture issues, and how Maine's existing codes do or don't address those concerns:

- Bob receives calls from members of the public in all types of building structures
- The majority of calls, however, focus on residential moisture problems. Many, if not most of these are from tenants.
- The one common factor from all mold calls from the public is moisture in the buildings.

- The most prevalent moisture problem: basement slab condensation.
- Building Codes do a good job overall of keeping significant amounts of groundwater and rainwater out/away from buildings. Plumbing codes do a good job of preventing plumbing leaks.
- Maine does have a model building code, but it is not enforced unless adopted by a municipality. Municipalities are not required to adopt the model building code.
- The Maine Model Building Energy Code contains a ventilation provision that helps address relative humidity issues in Maine buildings. Again, it is a voluntary code: municipalities are not required to adopt the model code.
- Moisture problems occur in both new and existing construction; and in all types and sizes of structure. However, complaints are more likely to come from individuals in existing construction.
- There are more legal routes available to Maine consumers to address problems in new construction.

Group Discussion

- It was the consensus of the group that mold issues in existing construction were more difficult to address than moisture problems in new buildings (where contractor warranties/design team liability might apply)
- The group expressed concern for the plight of the tenant, who has little to no control of the maintenance of the living space
- The insurance industry has reams of data about water issues in buildings (claims histories). **Frank Kimball offered to try to locate some data for Maine.**
- The group offered a general discussion of possible routes/strategies that could be implemented in Maine to address moisture and subsequent mold growth issues:
 - Mandatory Building Codes
 - Amend Warranty of Habitability statute to better address moisture problems
 - Require certificates of occupancy in all new construction and in all rental property turnovers
 - Training/certification of facilities maintenance personnel
 - Require moisture inspections during real estate sales
 - Change insurance and lending practices to require moisture inspections prior to insuring and/or lending

A subgroup was formed to research all of these issues and prepare a summary to bring back to the group at large. This report should be ready in advance of the third meeting of the Task Force in

December. Members of the subgroup are: Bob Stilwell; Gene Kaler; Dennis Kingman; Ed Antz; and

Mark Hyland. The group will be convened via conference call.

Item 8. Next Steps

The various subgroups will meet to accomplish their specific assigned tasks.

Because the foundation of this effort is consumer protection, a representative of the Attorney General's office will be encouraged to attend remaining meetings of the task force.

The next meetings of the full group are:

Tuesday, November 14, 2006 at 1:00 p.m.
Room 319 – Board of Pesticides Control, Augusta

Proposed Agenda:

- Review draft section on available science – Norm and Ivan
- Review matrix of available clean-up standards – Mold standards group
- Progress report on building standards development- Building standards group
- Next steps and agenda for last meeting.

Tuesday, December 19, 2006 at 1:00 p.m.
Room 319 – Board of Pesticides Control, Augusta

The meeting was adjourned at 4:45 p.m.

Appendix C-2: November 14, 2006 Meeting Notes



P.O. Box 2438, Augusta, Maine
04338

Telephone: 207/626-8115

Fax: 207/626-9015

E-Mail: miaqc@gwi.net

Meeting of the Task Force to Study Mold in Maine Buildings

(Resolve LD 1971)

Tuesday, November 14, 2006

1:00 p.m. to 4:00 p.m.

Room 319 of the Deering Building, Augusta

-MINUTES-

Present: Norman Anderson; Ed Antz; Carole Cifrino; Margaret Craven; Christine Crocker; Glenn Fellman*; Mark Hyland; Gene Kaler; Frank Kimball; Dennis Kingman; Larry Mare; Ivan Most; Dale Siulinski; Bob Stilwell

* = Present via conference call.

Key Action Outcomes of the Meeting:

5. Those present approved the Research Section as prepared by Norm Anderson and Ivan Most for inclusion in the final report. Anyone wishing to comment on the draft may still do so by e-mail to either Christy Crocker or Ivan Most.
6. Those present were asked to read the Connecticut Guidelines for Mold Remediation.
7. Glenn Fellman will be drafting the sections of the final report on Mold Assessment and Remediation standards. His summary will include a matrix of available standards, and their scope, purpose, and ANSI accreditation status.
8. Dale Siulinski will draft a section on occupational standards for inclusion in the final report.
9. Frank Kimball will draft a section on insurance industry considerations for inclusion in the final report.
10. Bob Stilwell and Clough Toppan will draft a section on real property considerations for inclusion in the final report.

11. Margaret Craven will obtain information on the lending community's perspective and forward it to Christy Crocker.
12. The subgroup on building codes (Bob Stilwell; Gene Kaler; Dennis Kingman; Ed Antz; Mark Hyland) will meet in advance of the December 19th meeting to develop a discussion agenda and possible recommendations.
13. Task Force participants will be asked to review and comment on the draft Matrix of Possible Actions for Maine. This document will be forwarded to the group via e-mail.

The meeting was called to order at 1:10 p.m.

Item 1. Welcome and Adoption of Minutes of 10/30/06 Meeting

Facilitator Ivan Most welcomed everyone to the meeting. Those present re-introduced themselves and noted their professional affiliations.

A motion was made, seconded and approved to accept the minutes of the October 30, 2006 task force meeting.

Item 2. Review of Draft Science and Research Section

Copies of the draft science and research section were forwarded to the group prior to the meeting.

Ivan reviewed the key points made by this draft section:

- For the majority of persons, undisturbed mold is not a substantial health hazard.
- Mold is a greater hazard for persons with underlying conditions: mold allergies, asthma, and immuno-suppressed conditions.
- Prolonged exposure to high levels of mold (and some bacterial species) can produce an immune-mediated disease known as hypersensitivity pneumonitis. Clinically, hypersensitivity pneumonitis is known by the variety of exposures that can cause this disorder (e.g., farmer's lung, woodworker's lung, and malt worker's lung).
- Ingesting (eating) mold toxins can cause disease.
- Proper prevention and management of conditions that can lead to mold growth (moisture, flooding) are the best means to protect occupant health.

Members of the task force were provided with an opportunity to comment on the draft. Those present liked the emphasis on the lack of science on the effect of mold exposure on the average person, and the quantity and quality of science on the effect of mold exposure on compromised individuals.

It was the consensus of those present that this draft section was ready for inclusion in the report. **Task Force members were asked to forward any additional comments to Christy or Ivan.**

Item 3. Mold Remediation Standards

Prior to the discussion on mold remediation standards, Ivan commented on the Connecticut guidelines for mold remediation that were released last week. **Ivan recommended that all members of the task force review this document, as it may provide a useful road map for action in Maine.**

A. Assessment Standards

Glenn Fellman provided the group with an extensive summary of available mold assessment (inspection) standards. In just the past year, the availability of well-respected, peer reviewed, accredited mold assessment standards have become available. Each of these standards has been developed by distinct groups with varying intention. A general summary of the types of assessment standards now available:

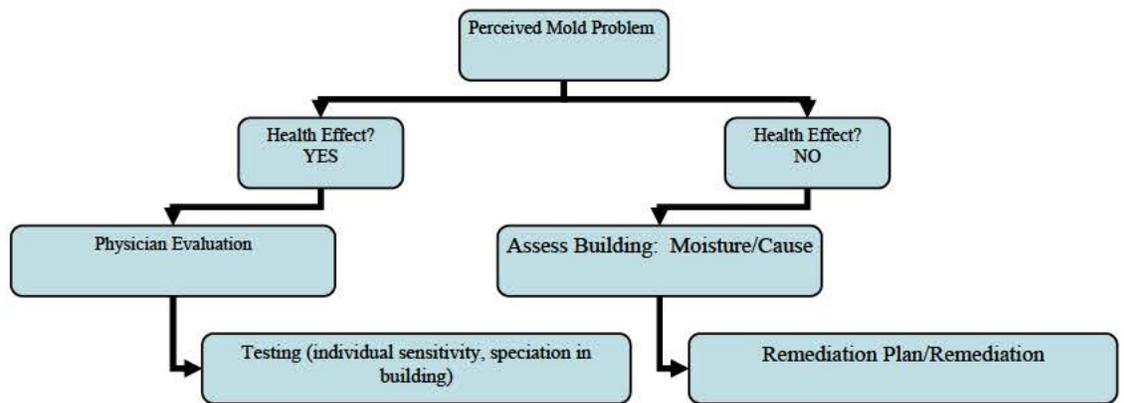
- Basic property inspection – for the general home inspection community
- Commercial property evaluation
- More intensive evaluation of properties where mold contamination is suspected or known.
- Evaluation of HVAC systems and components

Many mold assessment standards have now received ANSI (American National Standards Institute) accreditation.

The group spent a significant amount of time discussing how different types of properties are evaluated for mold contamination for varying reasons: property transfer, insurance claims, lending, or health concerns.

The group also discussed generally the issue of mold testing as part of the evaluative process, and the desirability to first focus on evaluating buildings for underlying conditions that lead to mold growth rather than initial emphasis on mold species identification. The group at large viewed as useful in limited instances, such as post cleaning verification and for evaluating correlation of health effect to molds present.

There was some discussion of a simple evaluation flow chart, based on whether or not health effects were being experienced in the buildings (see sample below):



The group identified a need for better guidance for the medical community. Glenn recommended contacting Dr. Claudia Miller from the University of Texas Health Science Center. Dr Miller has done some good preliminary work that might be useful to Maine.

At the conclusion of the assessments discussion, **Glenn Fellman offered to develop a summary matrix of available Mold Assessment Standards** for inclusion in the final report. This summary would include information about the scope, purpose, application, and accreditations of each standard.

B. Remediation Standards

Glenn Fellman provided those present with a review of available Mold Remediation standards. Unlike Assessment standards, few (none?) Remediation standards have received ANSI accreditation.

Also similar to Assessment standards, different standards have been developed by groups and organizations with varying goals and needs.

Glenn Fellman offered to develop a comprehensive list/matrix of available remediation standards. This summary would include information about the scope, purpose, application, and accreditations of each standard.

Consensus of the group following Glenn's presentation(s): This task force will not have sufficient time to evaluate each available assessment or remediation standard. The best this group can do is to identify available standards and recommend to the legislature that if selection of a standard or set of standards is deemed desirable for Maine, that a future study group be developed to evaluate these standards and make an appropriate selection

C. Enforcement Strategies/Certification/Licensing of Professionals

Glenn Fellman provided a general summary of enforcement strategies.

- Similar to Texas, a state licensing/regulatory body can endeavor to test and license mold assessment and remediation professionals. This strategy is similar to state testing and licensing of a variety of other Maine professions: engineers, attorneys, physicians, etc. Such a strategy is implemented at taxpayer expense, although offset somewhat by testing and licensing fees.
- Alternatively, a state could follow the Louisiana model, thus relying on independent third-party accreditations, managed by reputable organizations that undertake the training, testing, and accreditation of the professional community. Example certifications: CIH, CESB, CSP, CHMM, CIEC, CMC.
- Regardless of which route is chosen, Glenn strongly recommended a conflict of interest clause: the same company should not both assess and remediate the same mold contamination project.

The group discussed available options and mechanisms for enforcement. Overarching goals of any licensing/enforcement strategy: consumer protection. Other consumer protection strategies include:

- A state-endorsed list of mold assessment and remediation professionals
- Consider how existing Maine statutes for consumer protection (such as the construction contract law) do or do not address consumer protection from fraudulent assessment/remediation practices.

The group also discussed the desirability of obtaining data regarding the number of assessments and remediations being conducted in Maine.

C. Occupational Safety Standards

Dale Siulinski provided a brief history of OSHA’s approach to the presence of indoor environmental pollutants. OSHA’s “general duty” clause requires employers to provide a workplace that is free of identified hazards. In order for the general duty clause to be breached, a clearly defined hazard and subsequent exposure must be identified. Because of the inability to set exposure limits/standards, OSHA does not consider the presence of mold as an identified hazard. As a result, OSHA has published various guidance documents for employers emphasizing the prevention of mold in the workplace.

Dale Siulinski will draft a paragraph summarizing Maine’s occupational approach to mold for inclusion in the final report.

Members of the group commented on how similar challenges (hazard/exposure) exist relative to Maine’s Warranty of Habitability laws.

D. Market Issues

i. Insurance

Frank Kimball noted that most insurance data is national data, not Maine specific. However, the general insurance landscape is:

- Most property insurance policies do cover some mold damage
- The insurance industry stresses quick water/flood clean-up to minimize mold damage
- Water damage, flooding, plumbing problems – all covered under most policies
- Policies generally to *not* cover ground water intrusion.
- Insurance companies often rely on independent adjustors, as well as independent mold assessment professionals.
- While insurance companies do have the right to specify the professional qualifications of individuals conducting assessments and remediations, it is not clear if any companies currently do so. In Maine, it is left to the general marketplace.

Frank agreed to provide a written summary of the insurance industry approach to mold for inclusion in the final report.

ii. Real Property

Bob Stilwell reported that the Maine Association of Realtors' model purchase and sale agreement does include an option for perspective home buyers to request inspection for mold prior to purchase. The forms also request, but do not require, disclosure of any mold testing done in the home. Most home inspectors in Maine now recognize the value in evaluating properties for the conditions that lead to mold growth, rather than testing for the presence of certain species of molds and spore counts.

Bigger problems occur in rental properties. A significant portion of calls for assistance come from members of the public in landlord/tenant situations. A mechanism needs to be developed to either amend Maine's Warranty of Habitability statute or educate landlords/tenants to better address providing and maintaining a living environment without underlying moisture control issues.

Bob Stilwell and Clough Toppan agreed to provide a summary of real property issues for the final report.

iii. Banking

Margaret Craven has requested information from the Maine Bureau of Banking and Insurance and will forward it to Christy Crocker upon its receipt.

iv. Liability/Torts

(Although not discussed at the meeting, the existing Maine liability/tort laws face same science barriers as other industries. Without clearly defined hazard

and exposure limits, liability/tort laws will have little ability to address mold contamination.)

Item 4. Building Codes: Review Objectives, Task Identification for Subgroup

The subgroup charged with developing recommendations regarding building codes has had at least one preliminary meeting. This subgroup requested that the group at large narrow the scope, so that it could better address the issue.

The full task force recommended that the subgroup focus on building codes as they impact new construction. The subgroup could also briefly identify the barriers that exist for other types of code applications (rehab, etc.)

This subgroup will be asked to meet in advance of the next meeting to develop the discussion agenda and preliminary recommendations.

Item 5. Matrix of Possible Actions for Maine

Christy Crocker displayed a copy of a preliminary draft matrix. The purpose of the matrix is to identify the full range of possible action Maine could take relative to the issue of mold contamination in buildings. This matrix will be used to help present a very extensive list of complex actions in a simple visual manner.

Christy and other members of the task force will work to refine this matrix for presentation to the legislature in January.

Members of the full task force will be provided a copy in advance of the next meeting. Task Force review and input is requested.

Item 6. Next Steps/Agenda for Last Meeting

The next meeting of the task force is Tuesday, December 19, 2006 at 1:00 p.m. in room 319 of the Deering Building, Augusta.

At this meeting, the subgroup on Building Codes will present its findings.

Also at this meeting, Ivan Most will facilitate a priority setting brainstorming session. Members of the task force will be asked to identify what action relative to mold in buildings might be taken in Maine. Task force members will then be asked to prioritize those recommendations. The top priority recommendations will be presented to the legislative committee; remaining recommendations will be contained in the body of the report.

Shortly after the final meeting, a final draft of the report will be circulated to the task force for review and comment. Copies of the report will then be duplicated and submitted to members of the Natural Resources and Human Services Committees. The task force will request an opportunity to present the report.

The meeting was adjourned at 4:00 p.m.

Appendix C-3: December 19, 2006 Meeting Notes



P.O. Box 2438, Augusta, Maine
04338

Telephone: 207/626-8115

Fax: 207/626-9015

E-Mail: miaqc@gwi.net

Meeting of the Task Force to Study Mold in Maine Buildings

(Resolve LD 1971)

Tuesday, December 19, 2006

1:00 p.m. to 4:30 p.m.

Room 319 of the Deering Building, Augusta

-MINUTES-

Present: Norman Anderson; Ed Antz; Carole Cifrino; Margaret Craven; Christine Crocker; Glenn Fellman*; Mark Hyland; Frank Kimball; Larry Mare; Ivan Most; Dale Siulinski; Bob Stilwell; Charles Soltan

* = Present via conference call.

Key Action Outcomes of the Meeting:

Item 1. Welcome and Adoption of Minutes of 11/14/06 Meeting

Facilitator Ivan Most welcomed everyone to the meeting.

A motion was made, seconded and approved to accept the minutes of the November 14, 2006 task force meeting.

Item 2. Status Review

Ivan summarized for those present the status of the task force. The task force was asked to look at three key areas: current research (health/medical); available guidelines and standards; and building codes.

- The research section was drafted and reviewed by the group at the November meeting.
- The available standards section was discussed at the November meeting, and Glenn Fellman will be presenting a summary of that discussion at this meeting.
- A subgroup on building codes has met and developed a summary document for review by the group at this meeting.

Following today's meeting, Christy and Ivan will prepare a draft of the final report for the legislative committees. The draft will be forwarded to both the Maine Department of

Environmental Protection and the Maine Department of Health and Human Services/Maine CDC for departmental review.

The group will have the opportunity to review the final report outline at the end of today's meeting.

Item 3. Review Draft of Mold Remediation Report Sections

A. Assessment and Remediation Standards

Glenn Fellman presented a three-page spreadsheet that summarizes what standards are available, the organization that developed the standards, the scope and intent of each standard, and the independent accreditation status of each. The spreadsheet will be incorporated into the final legislative report.

A brief discussion followed Glenn's presentation, focusing on which standards might be preferred from a legislative perspective. In order of preference (1 being the top preference):

1. ANSI accredited standards preferred
2. Standards in development that are intended for ANSI approval
3. NY & CT Guidelines
4. Federal Guidelines

B. Occupational Health Standards

Dale Siulinski presented a report on available standards to protect workers from mold exposure. A summary of his report:

OSHA does not have an established standard regarding mold. Where OSHA does not have an available standard, it can rely on its "general duty clause" that requires employers to provide a work environment free from recognized hazards likely to cause harm to employees. Because limits on acceptable levels of exposure can not be set for mold, it is unlikely that this general duty clause can be applied to mold.

As a result, OSHA has focused on issuing general guidance to both prevent water infiltration in buildings as well as general guidance to protect workers engaged in mold remediation.

Following Dale's report, the group discussed briefly the new ASSE standard for worker protection that is currently in development. This new standard is designed to provide guidance to protect mold assessment and remediation professionals.

C. Real Property Considerations

Bob Stilwell distributed copies of a report prepared by Clough Toppan and himself focusing on mold issues in real property. The key points of this report are shown below. A full copy of the report will be included in the final legislative report.

- Rental Properties are of primary concern. The majority of calls from the general public are in landlord/tenant situations.
- The Maine CDC is able to assist many tenants through provision of accurate information about mold in homes.
- For those tenants with severe water intrusion or moisture problems, Maine consumer protection laws are available. Unfortunately, seeking legal recourse to address mold/moisture issues in an apartment can be a barrier to tenants, especially those who are elderly or have chronic illness and young children.
- Municipal health officers can be of assistance to address nuisance mold and moisture problems.
- Mold/Moisture problems in uninsulated slab on grade apartments are difficult to address if the landlord/tenant relationship is not a good one.
- Private homeowners have a wide variety of professional services available to them to assess and remediate moisture and mold problems in their homes.

D. Insurance Considerations

Frank Kimball presented a written report summarizing available insurance coverage for mold and moisture claims. A brief summary:

- Homeowners policies generally cover losses relating to mold that result from a covered cause of loss. Most policies limit the amount of coverage available.
- There is generally very limited coverage for mold under General Liability policies
- Commercial policies can have limited coverage for mold. Typical exclusions: faulty construction and repeated seepage or leakage last 14 days or more. Mold damage resulting from a covered loss can have limited coverage.

Frank's written report will be included in the final legislative report.

E. Banking Considerations

Representative Margaret Craven has spoken to several representatives of the banking industry. There appears to be little concern regarding lending risks to the bank should mold/moisture problems occur in buildings they cover. There was more concern for any occupational protection outcomes that might result from the work of this Task Force.

Item 4. Building Codes

Bob Stilwell presented a report prepared by a subgroup of the task force. Subgroup participants included Ed Antz, Gene Kaler, Bob Stilwell, Mark Hyland, Christy Crocker, and Ivan Most)

The report summarizes the availability and application of various building codes to a variety of Maine buildings (homes, schools, businesses). The MIAQC requested that the various codes (IBC, IRC, and IECC) be reviewed to determine the existence of any moisture control weaknesses.

Bob Stilwell conducted a review of the IRC. Identified code weaknesses:

- No flashing around windows and doors
- No provisions for fully insulating slabs and foundations
- No consistent provisions for vapor barriers/retarders

Rick Karg, an energy consultant and member of the MIAQC, compared the MIAQC Checklist for New Residential Construction and the IECC. Identified code weaknesses:

- No flashing (only air sealing) around windows and doors
- Provisions for insulating foundation walls only. No provisions for insulating under foundation slab.

Bill Turner, a building scientist and member of the MIAQC, and David Hart, an architect, are reviewing the IBC for moisture control weaknesses. Their summary is not yet available.

Based on these issues, the following conclusions were presented:

- Homes, schools, and commercial buildings will have *improved* moisture control if constructed in accordance with the Model Building Code *and* the Model Energy Code. However, the code provisions alone are not sufficient to *prevent* moisture problems resulting from construction technique/design.
- Key weaknesses in the codes themselves should be fixed and made mandatory for Maine:
 - Mandatory flashing of all windows and doors
 - Mandatory insulation under basement slabs: walls *and* floor.
 - Proper placement vapor retarders
- Consider making key IAQ features of the building codes unamendable
- Consider making building codes mandatory in Maine.

A summary of the task force discussion following Bob's report:

- Need to verify statutory references to codes for schools. Christy will check with Gene Kaler and forward a list of school legislation to Ed Antz.
- No unfunded mandates. State could not pass a mandatory building code without paying for its enforcement.

- It is unlikely that the legislature would pass either a mandatory building code or licensing of building contractors.

Item 5. Brainstorming Task Force Recommendations

The task force generated a lengthy list of possible recommendations to make to the legislature. Those present then prioritized the list through a simple voting/selection process. The list of recommendations is shown below. The number at the beginning of each recommendation represents the number of “votes” it received.

- 7 State should list procedures for assessment and remediation: provide guidance, guidelines (i.e. list that Glenn Fellman supplied) *Standards supplied by Glenn be prioritized by ANSI accreditation
- 6 Conflict of Interest Defined: Assessment v. Remediation
- 6 Tweak Model Building Code to address moisture control weaknesses
- 4 Assessment Only Done by Third Party Accredited Professional *Accredited Professional Should Involve Competency/Education
- 4 Remediation by Third Party Accredited Professional *Accredited Professional Should Involve Competency/Education
- 4 State Should Fund Another AG for Consumer Protection
- 4 State Role in Mold/Moisture issues should be defined and properly funded
- 4 Follow CT/NY Model: A State “Endorsed” Guideline
- 4 NO MORE MOLD TASK FORCES needed to develop recommendations – we have sufficient information now.
- 3 Licensing/Certification of Mold Assessment and Remediation Professionals
- 3 Require landlords to engage in mediation with tenants over mold/moisture disputes.
- 3 Define what constitutes a problem
- 2 State Register/Maintain a List of Accredited Professionals 2 State should define visible persistent mold for longer than one month as a “dangerous condition” pursuant to xxxxx
- 2 Identify provisions in Model Building Codes that are “unamendable”
- 2 Periodic report regarding mold related problems reported to the state (a tracking system for mold)
- 2 Funding a tracking system for mold

- 2 Mandatory moisture control and ventilation standards/codes for residences
- 2 Incorporate construction techniques for moisture control, prevention and mold assessment/remediation into existing building trades programs
- 2 Require moisture/mold inspection during real property transfer
- 2 Set Standards for property inspectors in moisture/mold inspections
- 1 Emphasize Prevention of Moisture Infiltration
- 1 Develop/require/inform worker protection standards for assessment and remediation personnel
- 1 Follow Established Guidelines for Assessment to limit unnecessary testing for mold
- 1 Building Commissioning for Commercial and Residential
- 1 Provide continuing education courses in moisture control, and mold remediation
- 1 Create an optional section for state model construction contract that has mold assessment/remediation specifications
- 1 Require landlords to disclose mold/moisture problems to potential tenants
- 1 Training on operations/maintenance to address mold/moisture for schools, other
- 0 Provide education to general public as to what is a mold problem and what isn't
- 0 Any State education program should be informed by latest available research
- 0 Provide a mechanism to get buy-in from building contractors on construction techniques to prevent moisture problems in building
- 0 Reward companies that are using accepted standards for assessment/remediation through incentives in insurance
- 0 Mandatory Building Codes
- 0 Licensing/Certification of Construction Contractors
- 0 Amend health officer statute to include mold/moisture as a health/safety nuisance
- 0 Mandated notification/education by carpet cleaning contractors on proper drying to prevent mold growth

Item 6. Review Draft Report Outline

The group reviewed a draft report outline that was distributed to those present. Several changes to the report outline were proposed. Ivan Most agreed to make these changes and distribute back to the group.

Item 7. Strategy for Report Review and Presentation

The group discussed the process for report review and presentation.

- Christy Crocker and Ivan Most will prepare a draft report for review by the full task force.
- A final draft, following group review, will be forwarded to Mark Hyland/Carole Cifrino at DEP and Clough Toppan/Bob Stilwell at DHHS for department review
- Mark and Clough will copy the report and distribute to the appropriate legislative committees.
- The report will be presented by DHHS and DEP representatives, and Ivan Most, MIAQC representative. It is unlikely that the report will be presented to the legislature until at least February.

The meeting was adjourned at 4:15 p.m.

Appendix D: Table of Existing Standards

The following is a complete list of the available standards and guidelines for the assessment and remediation of mold, as well as protection for remediation professionals. The table shows the available standard, the organization that developed it, its general scope or intent, and whether or not it has ANSI accreditation.

Voluntary, ANSI Accredited Standards		
E2418-06 <i>Standard Guide for Readily Observable Mold and Conditions Conducive to Mold in Commercial Buildings</i>	ASTM International (non-profit)	Scope: Assessment; commercial buildings
S500, <i>Standard and Reference Guide for Professional Water Restoration</i>	Institute for Inspection, Cleaning and Restoration Certification (non-profit)	Scope: Water damage restoration with emphasis on prevention of mold growth
Standard 62-2001 -- <i>Ventilation for Acceptable Indoor Air Quality</i>	American Society of Heating, Refrigerating and Air-Conditioning Engineers (non-profit)	Scope: The purpose of this standard is to specify minimum ventilation rates and indoor air quality that will be acceptable to human occupants and are intended to minimize the potential for adverse health effects.
Standard 62.2-2003 - <i>Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings</i>	American Society of Heating, Refrigerating and Air-Conditioning Engineers (non-profit)	Scope: defines the roles of and minimum requirements for mechanical and natural ventilation systems, and the building envelope intended to provide acceptable indoor air quality in low-rise residential buildings. This standard applies to spaces intended for human occupancy within single-family houses and multifamily structures of three stories or fewer above grade, including manufactured and modular houses.
Other Voluntary Consensus Standards		
<i>Standards of Practice for the Assessment of Indoor Environmental Quality, Volume 1: Mold Sampling, Assessment of Mold Contamination</i>	Indoor Environmental Standards Organization (non-profit) Note: Organization ANSI accredited 10/31/06. Standards to be submitted for ANSI approval in 2007	Scope: microbial assessment, primarily as it applies to home inspections for real estate transactions
S520, <i>Standard and Reference Guide for Professional Mold Remediation</i>	Institute for Inspection, Cleaning and Restoration Certification (non-profit)	Scope: mold remediation (residential, commercial, etc.)

	Note: Standard expected to be submitted for ANSI approval in 2007	
<i>Assessment, Cleaning and Restoration of HVAC Systems</i>	National Air Duct Cleaners Association (non-profit)	Scope: HVAC system cleaning, including mold conditions (residential / commercial)
Industry Guidelines (not standards)		
<i>Bioaerosols: Assessment and Control, 1999</i>	American Conference of Governmental Industrial Hygienists (non-profit)	Scope: assessment. (book has been widely used but is now somewhat outdated)
<i>Mold and Moisture Management in Buildings</i>	American Society of Heating, Refrigerating and Air-Conditioning Engineers (non-profit)	Scope: A series of over 20 articles and papers from the ASHRAE Journal, ASHRAE IAQ Conferences and ASHRAE's semi-annual meetings to help avoid mold & moisture problems in buildings
Voluntary Consensus Standards Under Development		
Standard for Commercial HVAC Maintenance (working title)	American Society of Heating, Refrigerating and Air-Conditioning Engineers (non-profit)	Scope: inspection and maintenance of commercial HVAC systems for cleanliness and performance Note: Expected to receive ANSI approval 2007
Standard for Residential HVAC System Cleaning	Air Conditioning Contractors of America	Scope: cleaning and restoration of residential HVAC systems for cleanliness and performance: Note: Expected to receive ANSI approval 2007
Guidelines for Mold and Fungi Control and Remediation for Worker Protection in Indoor Work Environments	American Society of Safety Engineers	Scope: safety for mold remediation worker protection; remediation practices
State and Municipal Guidelines		
Connecticut Guidelines for Mold Abatement Contractors	Connecticut	Scope: guidance to contractors performing mold abatement
Guidelines on Assessment and Remediation of Fungi in Indoor Environments	NYC	Scope: guidelines for assessment and remediation contractors; guidelines for consumers and property owner/managers
Federal Guidelines		
<i>A Brief Guide to Mold, Moisture, and</i>	EPA	Consumer oriented information

<i>Your Home</i>		about water damage, mold and related issues, including directions for cleaning
<i>Mold Remediation in Schools and Commercial Buildings</i>	EPA	Guidance for school maintenance personnel and related staff on mold remediation protocols; same for commercial buildings
<i>A Brief Guide to Mold in the Workplace</i>	OSHA	Guidance on mold prevention, testing and remediation

Task force discussions reflected that ANSI approved standards are preferred, followed by standards and guidelines in development that are intended for ANSI approval, and the NY and CT state-developed guidelines. Other guidelines and standards may have merit, but are either too general in nature or have not received the highly credible independent, third-party accreditation by ANSI.

Appendix E: MIAQC Policy Statement on Mold Exposure



P.O. Box 2438, Augusta, Maine 04338
Telephone: 207/626-8115
Fax: 207/626-9015
E-Mail: miaqc@gwi.net
Web: www.miaqc.org

MIAQC PUBLIC POLICY STATEMENT: MOLD EXPOSURE

Adopted by the MIAQC Board of Directors on November 6, 2003

Mold is everywhere in the natural environment, both indoors and out, and it is not practical to avoid exposure. However, extensive attention is being given to the issue of mold in indoor environments. Local, State, and Federal legislative efforts, as well as private sector initiatives, are underway or are being implemented as a means to respond to increasing public concern for the health and safety of our indoor environments. The Maine Indoor Air Quality Council recommends consideration of the following issues during the development or implementation of any initiative designed to regulate or otherwise manage mold in indoor environments.

The Science of Mold and Health

Whereas: Scientific studies of inhalation (breathing) mold exposures in the indoor environment have documented the following health effects in susceptible individuals:

- Simple irritant effects (itchy eyes, runny nose, headaches)
- Allergies in susceptible individuals (It is not known in the general population how much exposure or for how long is required to cause allergy. 5-10% of the population may be mold allergic.)
- Exacerbation of asthma (A link between mold and the development of asthma has not been established.)
- Infections in individuals with suppressed immune systems (the molds that cause infection in healthy individuals are not typically found indoors.)

Serious health effects from inhalation exposure to mold in the indoor environment (e.g., toxic reactions, infectious diseases, and chronic irritation) have not been well characterized. Toxic effects of mold have only been demonstrated following experimental exposures in animal studies and studies involving ingestion (eating) of contaminated foods.

Therefore: Additional health research is needed to better characterize the nature and scope of the health effects caused by indoor exposure to certain, specific molds. Particular attention should be given to the possible role of mold in producing serious, short-term or long-term effects on respiratory, immune, and nervous systems.

Since the research to characterize the effect of mold on human health is not fully developed, it is prudent to take precautionary measures, where practical, to prevent the growth of mold in the indoor environment.

Controlling Mold in Indoor Environments:

Whereas: Mold needs moisture and a suitable substrate (food/host) in order to grow and survive. The primary means to minimize mold exposure is by controlling moisture. Moisture problems may occur in buildings as a result of water intrusion (water leakage through the roof, foundation, or walls), high relative humidity (causing condensation), internal plumbing leaks, or poor or inadequate housekeeping.

Therefore: Building codes and operations and maintenance plans should include criteria to minimize the potential for moisture-related problems in new or modified (renovated) buildings. These codes and plans should ensure that energy conservation measures do not have an adverse impact on fresh air ventilation, occupant thermal comfort, or on relative humidity.

Professional organizations involved with the assessment of indoor environments should develop standardized methods for the assessment and remediation of moisture problems in buildings. They should develop training (and possibly certification) programs that focus on moisture prevention and remediation.

More education should be provided to increase public awareness of moisture control measures and their relationship to mold growth in buildings.

Resources:

MIAQC Policy Statement on the Health Basis for MIAQC Recommendations

MIAQC Best Practice Recommendation on Testing

ACOEM Evidence-based Statement on Health Effects Associated with Molds in the Indoor Environment

NYC DoH Guidelines for Assessment and Remediation of Mold in Buildings

ACGIH – Bioaerosols

www.buildingscience.com/mold

“Fungi: Toxic Killers or Unavoidable Nuisances?” by Harriet A. Burge, Ph.D., *Annals of Allergy, Asthma & Immunology* 2001;87(Suppl): 52-56.

“Indoor Air Quality & Health, Does Fungal Contamination Play a Significant Role? Emil Bardana, MD, *Immunology and Allergy Clinics of North America* 23 (2003): 291-309

Questions and Answers on *Stachybotrys chartarum* and other Molds. CDC National Center for Environmental Health. <http://www.cdc.gov/nceh/airpollution/mold/stachy.htm>

Molds in the Environment. CDC National Center for Environmental Health.

<http://www.cdc.gov/nceh/airpollution/mold/moldfacts.htm>

“Indoor Allergens: Assessing and Controlling Adverse Health Effects,” Institute of Medicine; Andrew M. Pope, Roy Patterson, and Harriet Burge, *Editors*. National Academy Press, 1993.

“Clearing the Air: Asthma & Indoor Exposures,” Institute of Medicine, National Academy Press, 2000, <http://www.nap.edu/books/0309064961/html/index.html>

“Damp Indoor Spaces and Health”, National Academy of Sciences, National Academies Press, 2004: <http://www.nap.edu/books/0309091934/html/>

Appendix F: Subgroup Reports

Appendix F-1 - Summary of Literature on Science of Mold and Health

Quoting from the report prepared by the CDC after the Floods of last year¹:

For the majority of persons, undisturbed mold is not a substantial health hazard. Mold is a greater hazard for persons with conditions such as impaired host defenses or mold allergies. Numerous species of mold cause infection through respiratory exposure. In general, persons who are immuno-suppressed are at increased risk for infection from mold. Although certain species of mold cause infection, many mold species do not cause infection. Infections from mold might be localized to a specific organ or disseminated throughout the body.

Many of the major noninfectious health effects of mold exposure have an immunologic (i.e., allergic) basis. Exposure to mold can sensitize persons, who then might experience symptoms when re-exposed to the same mold species. For sensitized persons, hay fever symptoms and asthma exacerbations are prominent manifestations of mold allergy. Although different mold species might have different propensities to cause allergy, available data do not permit a relative ranking of species by risk for creating or exacerbating allergy. In addition, exposure to beta glucans might have an inflammatory effect in the respiratory system.

Prolonged exposure to high levels of mold (and some bacterial species) can produce an immune-mediated disease known as hypersensitivity pneumonitis. Clinically, hypersensitivity pneumonitis is known by the variety of exposures that can cause this disorder (e.g., farmer's lung, woodworker's lung, and malt worker's lung).

Ingesting toxins that molds produce can cause disease. Long-term ingestion of aflatoxins (produced by *Aspergillus* species) has been associated with hepatocellular cancer. In addition, ingestion of high doses of aflatoxin in contaminated food causes aflatoxicosis and can result in hepatic failure. Whether concentrations of airborne mold toxins are high enough to cause human disease through inhalation is unknown, and no health effects from airborne exposure to mold-related toxins are proven.

Biomarkers

For biologic agents, few biomarkers of exposure or dose have been identified, and their validity for exposure assessment in the indoor environment is often unknown. Testing to determine the presence of

¹ Mold Prevention Strategies and Possible Health Effects in the Aftermath of Hurricanes and Major Floods

Prepared by Mary Brandt, PhD,¹ Clive Brown, MBBS,² Joe Burkhart, MS,³ Nancy Burton, MPH,³ Jean Cox-Ganser, PhD,³ Scott Damon, MAIA,² Henry Falk, MD,⁴ Scott Fridkin, MD,¹ Paul Garbe, DVM,² Mike McGeehin, PhD,²

Juliette Morgan, MD,¹ Elena Page MD,³ Carol Rao, ScD,^{1,5} Stephen Redd, MD,² Tom Sinks, PhD,²

Douglas Trout, MD,³ Kenneth Wallingford, MS,³ David Warnock, PhD,¹ David Weissman, MD³

¹National Center for Infectious Diseases²National Center for Environmental Health

³National Institute for Occupational Safety and Health⁴Coordinating Center for Environmental Health and Injury Prevention⁵Office of Workforce and Career Development

immunoglobulin E (IgE) to specific fungi might be a useful component of a complete clinical evaluation in the diagnosis of illnesses (e.g., rhinitis and asthma) that can be caused by immediate hypersensitivity. Detection of immunoglobulin G (IgG) to specific fungi has been used as a marker of exposure to agents that might cause illnesses such as hypersensitivity pneumonitis. However, the ubiquitous nature of many fungi and the lack of specificity of fungal antigens limit the usefulness of these types of tests in evaluating possible building-related illness and fungal exposure.

Specific serologic tests (e.g., tests for cryptococcal antigen, coccidioidal antibody, and *Histoplasma* antigen) are useful in the diagnosis of some fungal infections, but these are the exception. The routine clinical use of immunoassays as a primary means of assessing environmental fungal exposure or health effects related to fungal exposure is not recommended.

Mycotoxins

In recent years, increased concern has arisen about exposure to specific molds that produce substances called mycotoxins. Health effects related to mycotoxins are generally related to ingestion of large quantities of fungal-contaminated material. No conclusive evidence exists of a link between indoor exposure to airborne mycotoxin and human illness.

Although the potential for health problems is an important reason to prevent or minimize indoor mold growth and to remediate any indoor mold contamination, evidence is inadequate to support recommendations for greater urgency of remediation in cases where mycotoxin-producing fungi have been isolated.

Overview of Fungal-Induced Diseases

Fungi can cause a variety of infectious and noninfectious conditions. Several basic mechanisms can underlie these conditions, including immunologic (e.g., IgE-mediated allergic), infectious, and toxic. Several of these mechanisms contribute to pathogenesis of a fungal-induced disease.

The types and severity of symptoms and diseases related to mold exposure depend in part on the extent of the mold present, the extent of the person's exposure, and the susceptibility of the person (e.g., persons who have allergic conditions or who are immunosuppressed are more susceptible than those without such conditions). Molds produce a variety of volatile organic compounds, the most common being ethanol, which are responsible for the musty odors associated with fungal growth. Exposure to moldy indoor environments is also associated with a variety of upper and lower respiratory tract symptoms (6).

IgE-Mediated Diseases Caused by Fungi

IgE-mediated, or allergic, responses underlie the most common types of diseases associated with exposure to fungi. Atopy, or the genetic predisposition to form IgE responses to aeroallergens, is an important risk factor. Clinical conditions associated with allergies include allergic rhinitis and asthma. Allergic rhinitis is often associated with allergic conjunctivitis and sinusitis.

The conventional hierarchy of treatment is avoidance of exposure to inciting agents; pharmacotherapy with antihistamines, decongestants, or anti-inflammatory agents (e.g., nasal steroid sprays); or, as a last resort, allergen immunotherapy. Immunotherapy with fungal allergenic extracts is, with a few exceptions, of unknown efficacy.

Asthma is a disease characterized by episodic, reversible airways obstruction and eosinophilic airways inflammation. Over time, chronic asthma can lead to airways remodeling and irreversible airways obstruction. Approaches to demonstrating specific IgE sensitization to molds and limitations of available methods are as described for allergic rhinitis. Asthma is associated with airways inflammation that can be demonstrated by examining induced sputum for eosinophils or measuring exhaled nitric oxide, but these tests are often not performed in clinical settings.

Comprehensive guidelines for the staging and treatment of asthma are provided by the National Institutes of Health. Identifying and avoiding triggers, including occupational triggers, is a critical element of treatment. The role of allergen immunotherapy with most fungal agents in treatment of asthma is unclear.

Institute of Medicine Report on Damp Indoor Spaces and Health

In recent years, the issue of how damp indoor spaces and mold contamination affect human health has been highly controversial. In response, CDC commissioned the Institute of Medicine (IOM) to perform a comprehensive review of the scientific literature in this area. The resulting report was published in 2004 and remains the most current and authoritative source of information on this subject.

The IOM categorized its findings into four categories:

- sufficient evidence of a causal relation,
- sufficient evidence of an association,
- limited or suggestive evidence of an association, and
- inadequate or insufficient evidence to determine whether an association exists.

“Inadequate or insufficient evidence to determine whether an association exists” does not rule out the possibility of an association. Rather, it indicates that no studies examined the relation or that published study results were of insufficient quality, consistency, or statistical power to permit a conclusion about an association. No conditions exist for which the IOM found sufficient evidence of a causal relation with mold or with damp indoor spaces.

Sufficient evidence links upper respiratory tract symptoms (e.g., nasal congestion, sneezing, runny or itchy nose, and throat irritation) to damp indoor environments and mold (with exposure to mold often determined by self-report). Similarly, sufficient evidence exists for a link with the lower respiratory tract symptoms of cough and wheeze. Sufficient evidence also was found for a link between damp indoor environments, mold, and asthma symptoms in sensitized persons with asthma.

Evidence also is sufficient for an association between mold exposure and hypersensitivity pneumonitis in a small proportion of susceptible persons, invasive respiratory and other fungal infections in severely immunocompromised persons, and fungal colonization of the respiratory tract or infection in persons with chronic pulmonary disorders.

Toxic Effects of Fungi

Certain common molds can produce metabolites with a wide range of toxic activities such as antibiotic (e.g., penicillium), immune-suppressive (e.g., cyclosporine), carcinogenic (e.g., aflatoxins), emetic, and

hallucinogenic (e.g., ergot alkaloids). Mycotoxins are fungal metabolites that poison humans and animals. Although ingestion is the most common route of exposure, inhalation and dermal contact also are exposures of concern. Mycotoxin production is dependent not only on species and strain of mold, but also on environmental conditions (e.g., temperature, water activity, light) and growth substrate. Thus, the presence of toxin-producing mold species does not necessarily indicate whether mycotoxins are present.

Mycotoxins were prematurely proposed as the cause of a disease outbreak of eight cases of acute pulmonary hemorrhage/ hemosiderosis in infants in Cleveland, Ohio, in 1993 and 1994. The cluster was attributed to exposure to mycotoxins produced by *Stachybotrys chartarum*. Subsequent reviews of the evidence concluded that insufficient information existed and no such association was proven.

Because of the lack of information about noningestion mycotoxin exposure and adverse health effects in humans, precautions should be taken when handling heavily contaminated building materials.

Fungal Infections

Severely immunosuppressed persons, such as solid-organ or stem-cell transplant recipients or those receiving cancer chemotherapy agents, corticosteroids, or other agents inhibiting immune function, are at much higher risk for locally invasive infections of the lungs, sinuses, or skin and systemic infections.

Aspergillus spp., zygomycetes, and *Fusarium* spp. are particularly important problems. These serious infections are often fatal, even with aggressive antifungal therapy.

Obstructive pulmonary diseases such as asthma, cystic fibrosis, and COPD, might predispose persons to airway colonization with *Aspergillus* spp. Inflammatory host responses to colonization can lead to ABPA. *Aspergillus* spp. also can cause invasive or semi-invasive infection in persons with COPD, especially in those being treated with corticosteroids. Chronic necrotizing pulmonary aspergillosis is an indolent condition observed in persons with underlying lung disease.

Colonization of lung cavities (e.g., tuberculosis cavities or emphysematous blebs) by *Aspergillus* spp. can cause pulmonary aspergillomas (fungus balls), which are conglomerations of *Aspergillus* spp. hyphae matted together with fibrin, mucus, and cellular debris. These often do not cause symptoms, but they can be associated with hemoptysis (52,53). An exposure-response relation has never been established linking levels of exposure to *Aspergillus* spp. with development of any of these conditions.

Selected references:

24. Trout D, Seltzer JM, Page EH, et al. Use of immunoassays in assessing exposure to fungi and potential health effects related to fungal exposure. *Ann Allergy Asthma Immunol* 2004;2:483–92.

25. CDC. State of the science on molds and human health. Atlanta, GA: US Department of Health and Human Services, CDC; 2002. Available at <http://www.cdc.gov/mold/pdfs/moldsci.pdf>.

44. Institute of Medicine. Clearing the air: asthma and indoor air exposures. Washington, DC: National Academies Press; 2000.

60. Storey E, Dangman KH, Schenck P, et al. Guidance for clinicians on the recognition and management of health effects related to mold exposure and moisture indoors. Farmington, CT: Center for Indoor Environments and Health, University of Connecticut Health Center; 2004. Available at <http://oehc.uhc.edu/clinser/MOLD%20GUIDE.pdf>.

The following is extracted from testimony by Dr. Steven Redd in 2002.²

It is estimated that there are between 50,000 and 250,000 species of fungi, and fewer than 200 have been described as human pathogens that can cause infections. Molds are ubiquitous in nature and grow almost anywhere indoors and outdoors. More than 1,000 different kinds of indoor molds have been found in U.S. homes.

Two mold-produced toxins (aflatoxins and ochratoxin A) have been classified by the National Toxicology Program as human carcinogens (<http://ntp-server.niehs.nih.gov/>). Chronic ingestion of these toxins from eating contaminated foods has been associated with liver and kidney tumors in animals and people.

We also know that respiratory illnesses among workers may be attributed to mold exposures. In industrial and agricultural settings, various forms of hypersensitivity pneumonitis (e.g., farmer's lung, woodworker's lung, malt worker's lung), and other allergic responses and infectious respiratory diseases (e.g., aspergillosis) have been reported. Farmer's lung is caused by *Thermoactinomyces species* or fungi found in moldy hay, straw, or grain dust. Farmer's lung has been extensively reported in many countries including the United States, Canada, The Scandinavian countries, France, and other European countries. Reported prevalence of farmer's lung ranges from 0.5% to 9.6% in farming populations.

Outbreaks of hypersensitivity pneumonitis also have been reported in office buildings in relation to exposures to mold-contaminated humidifiers and ventilation systems (Arnold et al. 1987. *Early detection of hypersensitivity pneumonitis in office workers*, *American Journal of Medicine* 64:236-242 and Hodgson et al. 1987. *An outbreak of recurrent acute and chronic hypersensitivity pneumonitis in office workers*. *American Journal of Epidemiology* 125:631- 638)).

We also know that molds can cause illness when people are exposed to extensive mold growth indoors. In its 1993 report "Indoor Allergens," the Institute of Medicine (IOM) concluded that airborne fungal allergens were most often associated with allergic diseases, such as allergic rhinitis/conjunctivitis, allergic asthma, and hypersensitivity pneumonitis. In its 2000 report "Clearing the Air: Asthma and Indoor Air Exposures," IOM concluded that there is sufficient evidence of an association between exposure to mold and exacerbations of asthma. The IOM also stated that there was inadequate evidence that molds caused people to become asthmatic.

We do not know whether molds cause other adverse health effects, such as pulmonary hemorrhage, memory loss, or lethargy. We also do not know if the occurrence of mold-related illnesses is increasing. Other than surveillance for hospital-acquired infections, there is no system to track the public's exposure to and the possible health effects of mold.

² State of the Science on Molds and Human Health **Statement of Stephen C. Redd, M.D.** Chief, Air pollution and Respiratory Health Branch National Center for Environmental Health **Centers for Disease Control and Prevention, U.S. Department of Health and Human Services** For Release on Delivery Expected at 2:00 PM on Thursday, July 18, 2002 **State of the Science on Molds and Human Health July 18, 2002**

House Financial Services Subcommittees ? ? ????

In 1994, CDC conducted two epidemiologic investigations of reported clusters of the acute onset of bleeding from the lungs of very young children (pulmonary hemorrhage or idiopathic pulmonary hemosiderosis). In one investigation a possible association was reported between exposure to the mold *Stachybotrys atra* (*S. atra*) and disease. This association was not reported in the second investigation.

In a further review of our first investigation, CDC reviewers and an external panel of experts determined that there was insufficient evidence of any association between exposure to *S. atra* or other toxic fungi and idiopathic pulmonary hemosiderosis in infants.

In July 2001, following flooding in North Dakota, CDC investigated Turtle Mountain Reservation residents' concerns that mold contaminating their homes might be contributing to an increase in illness among tribal members. CDC assessed both the physical and environmental condition of the homes to identify any environmental hazards, including the presence of mold, and collected information on health conditions of the individuals living in the homes. An interim report identified several existing hazards unrelated to mold and made recommendations to address these hazards.

Appendix F-2: Building Codes

Building codes are minimum construction guidelines designed to insure life and fire safety and prevent structural degradation in buildings. Building codes are viewed as an extremely valuable tool to insure that building occupants have reduced risk of personal injury and adverse health effect from building-failure events and/or exposure to indoor pollutants.

The following summary addresses new construction only. We did not address existing construction in our discussions.

1. Brief History of Maine's Model Building Codes

Over the past few years, Maine's legislature has worked hard to develop a set of model building codes for use by municipalities that choose to implement them. A Building Codes Working Group was formed, and participants represented a broad spectrum of state and local government officials, building-related professionals, and other interested groups. At the recommendation of the Building Codes Working Group, the Maine legislature adopted a series of model codes:

The Maine Model Building Code. This code includes the International Residential Code (for new residential construction); the International Building Code (for new commercial construction) and the International Existing Building Code (for existing building rehabilitation). Existing life safety and ventilation provisions for commercial buildings were not affected by the model building code legislation.

The Maine Model Building Energy Code. This code includes the International Energy Conservation Code, as well as ASHRAE standard 62.2 for new residential construction. Existing life safety and ventilation provisions for commercial buildings were not affected by the model building energy code legislation.

There was significant opposition to implementing a set of mandatory codes for Maine. As a result, Maine's model building codes are voluntary. Municipalities are not required to adopt a building or energy code. However, if they choose to adopt a building or energy code, they must adopt the model codes. Further, the model building code is fully amendable by municipalities.

2. Application of Codes and Standards to Various Types of Construction in Maine:

Schools – because most public schools in Maine are constructed using some state funds, the Maine Bureau of General Services requires that all schools be constructed in accordance with the International Building Code. Maine schools have additional requirements to comply with the ASHRAE 62 ventilation standards, and exceed the energy efficiency requirements of the ASHRAE 90.1 energy standard. Building design and engineering is further required by Maine-licensed professionals.

Commercial Construction. New commercial construction in Maine must comply with the ASHRAE 62 ventilation standard and the ASHRAE 90.1 energy standard, regardless of whether or not that building is constructed in a municipality that has adopted a building code. In addition, the professional design and construction community, through attention to risk of professional liability, operates somewhat under a self-policing mechanism to insure that buildings are constructed in accordance with generally accepted “minimum acceptable practice” principles. Building design and engineering is further required by Maine-licensed professionals.

Homes. Unless a home is constructed in a municipality with an adopted building code, there are no codes or standards, or professional licensing/certification infrastructure, to insure that a home is built in accordance with generally accepted “minimum acceptable practice” principles. The exception: multi-family housing must comply with the ASHRAE 62.1 or 62.2 ventilation standard.

3. Moisture (and therefore Mold) Control in Maine Construction

There are two primary strategies for preventing mold and moisture in Maine buildings:

- 1) Preventing moisture from getting into a building
- 2) Providing a mechanism (both structural and mechanical) for moisture to get out of a building.

The Maine Indoor Air Quality Council has conducted a brief review of the building codes and standards contained in Maine’s model code family. The conclusions of this review:

Ventilation requirements for Maine schools and commercial buildings is adequate.

ASHRAE 62.1 and 62.2 are deemed to be acceptable minimum construction practice. Ventilation requirements for homes sufficient only if a municipality has adopted the model energy code.

Moisture Control Requirements of the IRC – Review conducted by Bob Stilwell. Full review contained in separate document. Summary:

The IRC 2003 addresses bulk water control **through** the building shell fairly well. However, the code does not state that this is one of the goals for the code in most areas, and it leaves some large 'holes', such as not addressing flashing around doors and windows. Also, the code does not address moisture issues due to condensation on ground-contact concrete, on water supply lines, or on water-using appliances such as toilets. The Maine CDC receives hundreds of calls from Maine residents with mold problems stemming from both of these issues. These areas must be addressed to reduce the incidence of mold contamination in Maine homes and apartments.

A lesser problem, but one not apparently addressed in this code, is control of water vapor through the building shell. There is some mention in places of installing a moisture barrier on the winter-hot side of wall and ceiling insulation, but that is all. There needs to be more attention to air movement through the shell and between conditioned and un-conditions spaces. These uncontrolled air movements can create tremendous mold problems in wall cavities and attics. These also need to be addressed.

Moisture Control Requirements of the IECC – Review provided by Rick Karg (comparison of MIAQC Checklist for New Residential Construction with IECC with IECC references is shown in a separate document.) Summary:

The IECC contains some of the moisture control references that the IRC does not, specifically, references to sealing around windows and doors (but *not* flashing), and installation of vapor barriers (sometimes referred to as vapor retarders) on the warm side of the wall structure.

The IECC contains references for foundation wall insulation, but not foundation *floor insulation*.

Moisture Control Requirements of the IBC – Gene Kaler, Bill Turner providing review

Moisture Control Requirements of the IEBC – who review pending?

4. Comments/Value Statements:

Comments on the Model Codes:

In order to have real impact on the quality of residential and commercial construction in Maine, the model codes should be both mandatory and certain provisions (moisture control, ventilation, and structural/fire/life safety) unamendable.

On Code Application:

Residential construction has sufficiently less available or enforced guidance than school or commercial construction. Further, unlike commercial and school construction that at least requires licensed design professionals, residential construction has no similar controls.

5. Conclusions (tentative)

The following strategies would help prevent mold problems in buildings from design and construction defects:

- Homes, schools, and commercial buildings will have *improved* moisture control if constructed in accordance with the Model Building Code **and** the Model Energy Code. However, the code provisions alone are not sufficient to **prevent** moisture problems resulting from construction technique/design.
- Key weaknesses in the codes themselves should be fixed and made mandatory for Maine:
 - Mandatory flashing of all windows and doors
 - Mandatory insulation under basement slabs: walls *and* floor.
 - Proper placement vapor retarders
- Make building codes mandatory in Maine.
- Identify key provisions of building codes that are **unamendable** when adopted by a municipality
- Require licensing and/or certification of construction professionals (contractors)

Maine Municipalities that have adopted codes

- *International Building Code*
- *International Residential Code*

Bangor

- *International Building Code*
- *International Mechanical Code*
- *International Property Maintenance Code*
- *International Residential Code*

Bar Harbor

- *2003 International Building Code*
- *2003 International Residential Code*

Belfast

- *International Building Code*
- *International Code Council Electrical Code Administrative Provisions*
- *International Energy Conservation Code*
- *International Fire Code*
- *International Fuel Gas Code*
- *International Mechanical Code*
- *International Plumbing Code*
- *International Private Sewage Disposal Code*
- *International Property Maintenance Code*
- *International Residential Code*
- *International Zoning Code*

Biddeford

- *2003 International Building Code*
- *2003 International Energy Conservation Code*
- *2003 International Existing Building Code*
- *2003 International Mechanical Code*
- *2003 International Plumbing Code*

- *2003 International Property Maintenance Code*
- *2003 International Residential Code*

Boothbay Harbor

- *International Property Maintenance Code*

Calais

- *International Building Code*

Cape Elizabeth

- *International Building Code*
- *International Fire Code*

Eastport

- *International Building Code*

Falmouth

- *International Building Code*
- *International Fire Code*
- *International Residential Code*

Gardiner

- *International Building Code*

Houlton

- *International Building Code*

Kennebunk

- *International Building Code*
- *International Residential Code*

Lewiston

- *International Building Code*
- *International Property Maintenance Code*
- *International Residential Code*

Mechanic Falls

- *International Building Code*

Newport

- *International Building Code*
- *International Property Maintenance Code*
- *International Residential Code*

North Berwick

- *International Fire Code*
- *International Mechanical Code*
- *International Property Maintenance Code*

Ogunquit

- *International Building Code*

Old Town

- *International Building Code*
- *International Residential Code*

Poland

- *International Building Code*
- *International Residential Code*

Portland

- *2003 International Building Code*
- *2003 International Energy Conservation Code*
- *2003 International Mechanical Code*
- *2003 International Residential Code*

Presque Isle

- *2003 International Building Code*
- *2003 International Residential Code*

Saco

- *2003 International Building Code*
- *2003 International Existing Building Code*
- *2003 International Property Maintenance Code*
- *2003 International Residential Code*

Sanford

- *International Building Code*
- *International Fire Code*
- *International Mechanical Code*
- *International Residential Code*

South Berwick

- *International Building Code*
- *International Residential Code*

Waterville

- *International Building Code*
- *International Residential Code*

Appendix F-3: Occupational Health Standards for Mold

The Occupational Safety and Health Administration (OSHA) develops and enforces standards in order to protect workers. OSHA has not established a standard regarding mold. Where OSHA has not issued a standard, OSHA Compliance Safety and Health Officers may use the General Duty Clause, 5(a) (1) of The Occupational Safety and Health Act of 1970 to cite non-compliance. The General Duty Clause requires employers to “furnish to each of his employees employment and a place of employment, which are free from recognized hazards that are causing or likely to cause death or serious physical harm to his employees”. Employers must also “comply with occupational safety and health standards promulgated under this Act”. Additionally, there are national consensus standards from the American National Standards Institute and Institute of Inspection, Cleaning and Restoration Certification that OSHA could consider referencing in a general duty clause citation.

OSHA establishes Permissible Exposure Limits for hundreds of airborne contaminants. Permissible Exposure Limits (PELs) represent allowable airborne concentrations of substances that most workers may breathe over an eight-hour work shift without ill- health effects. Currently, there are no federal standards or recommendations from OSHA, the National Institute of Occupational Safety and Health or the Environmental Protection Agency for allowable airborne concentrations of mold or mold spores. Scientific research on the relationship between mold exposures and health effects is on going. Therefore, none of the major federal agencies, including OSHA, recommend routine air sampling for molds as part of a preliminary building assessment because there are no PELs, human dose-response data is not well correlated to specific agents and human tolerance to molds varies widely.

OSHA proposed a regulation on indoor air quality in 1994. During the rule making process, the Agency received comments and scientific and technical information on indoor mold exposures associated with building-related illnesses. The proposed rule was withdrawn in its entirety in 2001. However, it was evident to OSHA from reviewing the information received during the comment period that the infiltration of moisture into buildings is the main source of mold-associated building-related illness. Consequently, the focus of OSHA has been directed to the prevention of water infiltration in buildings as well as protection of workers engaged in mold remediation.

Appendix F-4: Maine Insurance Mold Facts

Property and casualty insurance coverage for mold

Mold, not unlike lead and other environmental exposures, has generated substantial claims costs to insurers throughout the United States over the past several years. These costs would ultimately be reflected in increased premiums for policyholders. Accordingly, the insurance industry has developed products which limit insurers' exposure to mold claims as more fully discussed below.

Homeowners Insurance Policies:

Homeowners insurance generally reimburses the insured for covered losses to the extent provided for by the policy. It also provides the homeowner with protection against liability claims filed by third parties.

Many homeowners insurers have implemented endorsements to restrict coverage for mold (i.e. wet/dry rot, fungi or bacteria) and any mold resulting floods is not covered..

Many limit coverage to amounts ranging from \$2,500 up to \$10,000 for all costs relating to mold (resulting from a covered cause of loss). (It should be kept in mind that flood is not a covered peril under homeowners insurance policies.)

Two advisory organizations, Insurance Service Office (ISO) and the American Association of Insurance Services (AAIS) develop standard product forms for use by their subscribing insurers.

Insurance Services Office (ISO) forms:

- Cover mold resulting from a covered cause of loss as long as neglect is not a factor
- Cover hidden damage from unseen plumbing leaks, as long as insured takes proper steps as soon as the damage is known
- Provide an exception for mold caused by water from fire suppression (for lightning or fire causes of loss)
- Presumably will cover up to policy coverage A limit on dwellings.
- Limit of liability for bodily injury or property damage arising out of mold is a sublimit of Coverage E (Personal Liability)
- Personal injury coverage endorsement excludes personal injury arising out of actual or alleged inhalation or ingestion of mold

American Association of Insurance Services (AAIS) forms:

- Exclude coverage for loss caused by repeated or continued seepage/leakage of water from a plumbing, heating, air conditioning, fire suppression sprinkler, water heater or domestic appliance, and therefore do not cover mold resulting from hidden damage as ISO forms will.
- Provide, on an optional basis, an absolute exclusion for mold damage regardless of the cause of loss is involved.
- Other options for coverage:
 - One form provides for mold caused by leaky plumbing
 - One form provides coverage if resulting from any covered cause of loss

- Both include \$2,500 for reasonable costs to test, with aggregate limit of \$10,000 for policy period.
- Both also include \$50,000 aggregate for bodily injury or property damage resulting from ingestion, inhalation, physical contact with, or exposure to, mold

Independent forms:

While a large majority of homeowners insurers utilize the forms developed by the two advisory organizations discussed above, some insurers use their own independent products. Insurers with independent forms are typically the larger companies. Examples include the State Farm, Allstate, and USAA. Specific terms of coverage may vary from company to company; however, some exclude loss from mold due to the presence of water over a period of time. Although the wording differs from the AAIS coverage, the result appears the same in that there would normally be no coverage for hidden damage.

General Liability (GL) Insurance Policies

General liability insurance protects the insured with respect to his or her liability to third parties for damages caused to the extent of coverage provided under the policy. It does not protect the insured with respect to his or her own damages.

On a national level there is some argument that mold is a pollutant, and therefore excluded by the pollution exclusion contained in liability insurance policies. Most courts currently appear to view something that occurs naturally, such as mold, to preclude application of the pollution exclusion.

ISO endorsements for GL are similar to the homeowners exclusions and restrictions.

- Exclusion precludes coverage for bodily injury or property damage which “would not have occurred in whole or in part but for.....” the exposure, etc., to any fungi or bacteria.
- Limited coverage endorsement allows an aggregate limit to be scheduled, that will be the most that will be paid for all bodily injury, property damage, and medical payments arising out of this exposure.

Commercial Property Policies

Commercial property insurance coverage would typically be purchased with respect to rental housing of more than four units and with respect to other commercial buildings.

ISO has instituted limited coverage:

- Exclusion for “repeated seepage or leakage” has been revised to include the “presence or condensation of humidity, moisture or vapor” – no coverage for mold loss if these conditions have been present for 14 or more days.
- Exclusion for faulty construction: if faulty construction results in increased moisture or humidity that leads to mold – no coverage.
- Modified exclusion for wear, tear, rust, corrosion etc. – fungus removed from this exclusion and given one of its own, no coverage for “the presence, growth, proliferation, spread or any activity of ‘fungus’.” Coverage still exists if mold results from fire or lightning, similar to the homeowners, or to the extent provided as an additional coverage.

- Additional coverage endorsement provides annual aggregate of \$15,000 for mold resulting from perils other than fire or lightning. If flood is endorsed onto the policy, resulting mold will be included.
- The \$15,000 is not in addition to the policy limit, however; it is included within the limit.
- The additional coverage endorsement includes time element loss if the policy covers time element, for up to 30 days.
- Limits of other than the standard \$15,000 and 30 days may be selected.

AAIS:

- Has not developed specific endorsements for commercial property forms. It is expected that mold arising from a covered cause of loss is covered under policy limits if insured has taken reasonable steps to prevent further loss.

Appendix F-5: Real Property Considerations

I. Rental property

Over the past few years, it has become clear that many Maine residents have concerns about mold in properties they rent. The Maine CDC, Division of Environmental Health, the agency ultimately receives virtually every mold call or question sent to any Maine state agency, has noted that approximately 90% of all mold calls received are from people living in rented housing. Most of the calls received are from tenants who feel the landlord is not doing enough to address mold growing in the rented property- a perception many times created by biased stories in the media that warn of 'toxic molds', rather than providing accurate information on how moisture problems can cause mold. Many times the tenants describe a situation that is much less severe than they initially believe, and providing them with unbiased information on the moisture problem that may be causing mold is sufficient to address their concerns. However, there are many instances where it appears that the tenant may have a reasonable concern. In those instances, the tenant is directed to resources appropriate for their needs. In many cases, the resources are only available through the legal system.

Maine law provides the tenant and Landlord a number of general guidance documents. A good summary of them is the Consumers Law Guide, found in <http://www.maine.gov/ag/index.php?r=clg&s=chap14> and titled Chapter 14, Consumer Law Guide: Consumer Rights When You Rent An Apartment

This is a 26 page document that covers many situations in which a tenant may need assistance. The Office of the Maine Attorney General prepared the Consumer Law Guide in 1994 and is a comprehensive review of Maine consumer law. This reference can provide good advice, but, as with all such documents, it was not meant to take the place of professional advice in any specific situation. If a tenant believes their consumer rights may have been violated and litigation is being considered, they should first consult with a private attorney.

The Guide consists of 17 sections, and the section that most closely would relate to mold problems, is section §14.18. Notice of Violation Of The Warranty Of Habitability Act. 14 M.R.S.A. §6021 says that all landlords must maintain their rental unit free from any condition which endangers or impairs the health or safety of any tenant. If a landlord is found to have violated this law, a judge can order the landlord to correct the defect and reduce any future rental payments and return to you rent which you have already paid to the landlord.

Another statute which provides assistance to a tenant is Title 17 §6026, Dangerous conditions requiring minor repairs.

This law requires a landlord, in a structure containing no more than 5 dwelling units, to maintain the dwelling unit such that it is free of dangerous conditions. This is undefined but is still a very good tool to utilize.

Other statutes that do not specifically relate to rental property, but seem to be applicable are those governing local health officers (HO). General duties of the HO are to report diseases to the Department of Human Services, although nearly all such reports are now made by doctors in the local clinics and hospitals. The biggest duty by far seems to be receiving and examining all complaints concerning nuisances dangerous to life and health. As such the HO may enter upon or within any place or premises where nuisances or conditions dangerous to life and health are known or believed to exist, and personally, or by appointed

agents, inspect and examine the same.

The most likely complaint ends up falling under the abatement of miscellaneous nuisances. Maine law, 17 §2702 discusses the abatement of nuisances and details the manner in which they are to be resolved in a municipality. Title 17 § 2741 covers some common nuisances and the jurisdiction to abate them. Some common nuisances are referred to 17 MRSA §2802. Failure to remove the nuisance may result in a fine (22 MRSA §1561). Typical dealings are:

- Malfunctioning disposal systems are a nuisance, as stated in 30A MRSA §3428
- Dangerous buildings, as stated in 17 § 2851.
- Local Health Officers are frequently called upon to take action regarding dangerous buildings (17 §2851)
- Protecting drinking water and water sources from contamination resulting from floods, power outages, and fires
- Evaluate public bathing beaches
- Smoking in public places
- Child or adult abuse or neglect (22 MRSA §4011 or 22 MRSA §3477)
- Others includes offensive smells, filthy substances and discarded motor vehicles

Working with the Animal Control Officer

The first two references listed above (malfunctioning disposal systems and dangerous buildings) are somewhat unique as the town may not only pay to have these problems corrected (as with all nuisances), but they can apply a lien to the property. This is a very powerful tool.

It is appropriate to consider the HO as a resource for tenants when normal communications with the landlord fail because each municipality is mandated to appoint a Local Health Officer (22 MRSA §451). In the event of incapacity or absence of the Local Health Officer, the municipal officers have to appoint a person to act as Local Health Officer during such incapacity or absence. Failing to make such an appointment, the chairman of the municipal officers are required to perform these duties until the regular Local Health Officer is returned to duty or appointment of another person has been made (22 MRSA §451). Basically, each town has someone responsible to carry out the duties of HO.

While the above noted regulations can be of great use to tenants who are faced with moisture issues in their rented property, they are not without weaknesses. For example, the recourse for a tenant under the Warranty of Habitability Act is to take the landlord to court. This can be a hardship for many tenants, particularly the elderly or those with small children. Based on the mold-related calls received by Maine CDC, the preponderance of tenants who call the State looking for assistance for mold issues are elderly, have a debilitating disease, or have small children. As for calling upon the HO, they are often an individual who was asked to serve, but has no real training on what the post entails. In other instances when the town has with large numbers of rental units, the HO has become swamped with requests from tenants, and had to make a policy decision to push the tenants to follow the points in the Consumer Law Guide rather than conduct a full investigation for each complaint received. This again gets into the issue of forcing those with limited resources, etc. to take legal action against their landlord. The delay in getting problems addressed while proceeding through the legal system can also put tenants with medical concerns exacerbated or caused

by the mold at greater risk for greater or permanent health damage.

Another weakness in this system has been pointed out in instances where the mold problem is due to condensation on concrete floors in slab-on-grade apartments, or concrete walls and floors in basement apartments. The problem results from unintended consequence of a common building practice, and through no fault of the landlord. However, it does become an issue for both the tenant and the landlord because they both must work together to manage this problem. All too often one or both refuse to work together, resulting in a bad situation for both.

II. Homeowners property

There are a number of nuisances stated in Maine law. In these instances the local Code Enforcement Officer can assist if they relate to Land Use Laws. Unfortunately, none pertain to mold. Should a homeowner have mold problems, the Maine Center for Disease Control & Prevention recommends the homeowner first and foremost look for the source of water or excessive moisture, and remove it. There are private consultants that can be contracted to assist in locating or remedying the situation. For assistance in testing, we generally suggest a home inspector trained in identifying water problems. Other consultants, such as those used in industry, can also be helpful here but will much more expensive. Either should have training from a reputable source.

Regarding mold remediation, there are many contractors with appropriate training. Historically we have recommended the use of fire and flood restoration companies, but with the recent improvements in training other companies are providing reasonably priced, reliable mold remediation services. A major consideration for the homeowner (and for the landlord, too) is to make sure that the first item addressed is to correct the moisture problem that allowed the mold to grow. The next step is to safely remove/clean all mold-contaminated materials, followed by reconstruction as appropriate.

III. New Construction

In all new structures, consideration should be given to prevent moisture problems from condensation on ground-contact masonry as well as the traditional considerations given to surface water and ground water. Additionally, all moisture control methods specified in codes or as good practice should be followed. See the section on Codes for additional information on how existing codes address moisture prevention.

Appendix G: Excerpts from Connecticut Law passed June 7, 2006, and subsequent content of Connecticut Mold Web Page



Substitute Senate Bill No. 317

Public Act No. 06-195

AN ACT CONCERNING REVISIONS TO DEPARTMENT OF PUBLIC HEALTH STATUTES.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

...

Sec. 40. (NEW) (*Effective from passage*) On or before October 1, 2006, the Department of Public Health shall publish guidelines establishing mold abatement protocols that include acceptable methods for performing mold remediation or abatement work. Such guidelines shall not be deemed to be regulations, as defined in section 4-166 of the general statutes.

Approved June 7, 2006

This web page can be accessed at: http://www.dph.state.ct.us/BRS/EOHA/mold_problems.htm

The Connecticut Department of Public Health **Keeping Connecticut Healthy**

Understanding and Addressing Mold Problems

Molds are a type of fungus that may grow on indoor surfaces, and may look cottony, wooly, smooth, or velvety. The velvety looking surface is actually thousands of microscopic spores. These spores can travel through the air, land somewhere else, and grow new colonies if food, water, and warmth are present.

Molds are everywhere. Most indoor molds come from the outdoors, and are carried inside on our shoes, clothes, through open windows, doors, and mechanical ventilation systems. Every home, office, and school in the country has some mold inside that was carried in from the outdoor environment. When there is a moisture problem in a building such as one caused by a flood, water leak, or very high humidity, the small amount of mold naturally found there may start growing.

In some cases, certain sensitive people may begin developing symptoms when exposed to large amounts of mold. These symptoms may include allergic reactions, asthma episodes, and other respiratory problems. It is important to remember that *not all people are susceptible to mold*.

Most mold problems in buildings are *not* emergencies. They can be dealt with using fairly easy techniques. Some resources to help you deal with clean-up are listed below.

Here are some main points to keep in mind when evaluating a mold problem:

- Without water, mold cannot survive.
- All mold growths are potential health hazards and should be removed.
 - Sampling/testing for mold is expensive and usually not necessary. If you see it, remove it.

The best way to address the mold problem is to:

- Find and fix the moisture problem.
- Clean up the mold using safe procedures.

Further information about mold may be found by clicking the links below.

Mold Testing

- [Testing Should Not be the First Move](#)

Residential Structures:

- CT Department of Public Health Fact Sheet: [Mold in the Home](#)

- Environmental Protection Agency: [A Brief Guide to Mold, Moisture and Your Home](#)
- Health Canada: [Condominium Owner's Guide to Mold](#)
- Health Canada: [Fighting Mold - The Homeowners' Guide](#)

Schools:

- [Connecticut School Indoor Environment Resource Team](#)

Remediation Guidelines:

- [Connecticut Guidelines for Mold Abatement Contractors](#)
- NYC Dept of Health & Mental Hygiene: [Guidelines on Assessment and Remediation of Fungi in Indoor Environments](#)
- Environmental Protection Agency: [Mold Remediation in Schools and Commercial Buildings](#)

For more information about mold issues, contact your local health department:
http://www.dph.state.ct.us/Local_health/index.asp

Or

Call the Connecticut Department of Public Health at:
860-509-7742

[Back to DPH Home Page](#)